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Editorial Office

Editor-in-Chief
IJIDT
Administrative Block, 2nd Floor,
M.M. University
Mullana-Ambala (India)
Pin- 133 207
editor.ijidt@gmail.com
editor.ijidt@mmumullana.org

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GUEST EDITORIAL

The library as centre of knowledge is undergoing dramatic change. It is time to contemplate how the role of our academic libraries is changing in the vibrant social media age. Social media tools like face book, twitter, flicker and YouTube can be used effectively to promote academic libraries. Social networking can be an effective method of student outreach in academic libraries, if libraries take care to respect student privacy and to provide equal coverage for all subject areas. Googlezation is the answer for all our day to day questions. Libraries are taking a backseat in providing ready answers to every man's need but using Face Book, Twitter, Flicker and YouTube, Chat etc. To help libraries to keep pace with the changing times, the current status of academic libraries needs reformation, as academic Library 2.0. There is no doubt that the academic libraries are crucial in higher education and they shall continue to be the back bone of teaching, learning and research. But the process and services of the academic libraries have to evolve to accommodate the epochal change in publishing and communication. Libraries must embrace the changes in the information environment, to stay relevant in the Web 2.0 world. In general libraries must become partners in teaching, learning and research. Today the transmission and promotion is definitely through social media,rather than the slow and time consuming print materials like broachers and news letter. So let us hope that the academic libraries will adopt more and more social media tools and techniques, to remain the nerve centre of knowledge in university campuses. Academic libraries should consider using social networking as an outreach effort, but must take care to avoid the probable negative consequences among the library users.

Today Facebook, MySpace, Twitter, Second Life, Delicious, Blogs, Wikis are just a few of the social networking options available on the Internet. The use of social networks or connections; the use of Web sites which enable users to interact with one another, find and contact people with common interests, etc., are the in thing. The varied social networking tools are increasingly used by individuals of all ages but are especially popular among young people and college students. Due to high use among these two groups, many academic librarians advocate using these new social Web platforms to reach out to student population. Online social networking by academic libraries is not, however, free from controversy. While some maintain that social networking efforts are a successful and innovative method of student outreach, others argue that social networking by academic librarians is an ineffective use of librarian time and effort. A review of recent literature shows that social networking by academic librarians provides a potentially effective method of student outreach as long as librarians take into account the possible issues that may arise. So let us Yahoo with social media at Academic Libraries!!

Ashok as an editor is doing a good job in bringing out International Journal of Information Dissemination and Technology. The papers are well researched and the periodicity is well maintained without any delay. CONGRATS to You Sir!

Dr. Khaiser Nikam
Prof. & Chairperson
Dept. of Studies in LIS
University of Mysore,
Mysore-Karnataka

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Guest Editorial

ICT and Open Access in LIS

Library and Information Science (LIS) profession is one of the most challenging and important professions in the knowledge society, because Information and Communication Technology (ICT) competencies are rapidly affecting in knowledge world and creating new challenges and opportunities for the LIS professionals. The traditional library services (cataloguing, classification, circulation, searching techniques, etc.) provided by LIS professionals were not enough to cater users' demands.

The information requirements of 21st century users' are very different in comparison to the previous century. So to cope up with users' demands and services in the 21st century, LIS professionals developed their technical&communication skills, project management, time management, presentation skills etc. Management and interpersonal skills makes LIS professionals more effective in the 21st century environment.

In this era of information explosion, the tremendous amount of information is being generated and transmitted over the World Wide Web and through various other popular mode of communication in digital and print format such as research articles, books, lectures, presentations, technical reports, standards and patents etc. In the early stages of 20th century, libraries were facing the problems, of how to cater and fulfill the users' demand in minimum span of time. To deal with new challenges and increasing demand of users, libraries and librarians of 21st century are reconsolidating; reshaping, redesigning and repackaging their services and information products by incorporating ICT based products & services.

Owing to these new ICT products & services the library services has got drastically changed. There are even change in librarianship vocabulary: 'dissemination' is being replaced by 'communication', 'database' by 'repository', 'literature' by 'knowledge', 'search' by 'navigation', etc., Akintunde (2004).

The present boon of ICT based products & services have a great impact on libraries and the impact is quite perceptible right from the beginning as the libraries started adopting ICT in the form of automation, stage of digital archives, library 2.0, and now we are providing library services through smart phones.

There is a symbiotic relationship between the library and ICT, such that any development in ICT accelerates library development. In the same vein, any development in the library today can only be through the deployment of ICT, Akintunde (2004).

On the other hand Open Access is playing a vital role for the rapid development of academic life. Open access scholarly journals are heart of the academic life.

Open Access (OA) means that electronic scholarly articles are available freely at the point of use. The subject has been discussed for over 10 years, but has reached a crescendo of discussion over the last few years with various declarations in favor of OA from groups of researchers or their representatives, Jeffery (2006).

'Open access' is normally defined as a situation where content is made available freely, immediately and without restriction. The content may then be used and re-used without restrictive copyright and permission barriers, Stephen (2008).

In the longer term, it is observing open access is the future of publishing.

All researches greatly depends on previously published studies, open access proving the foundation to researches by giving access & sharing to these previous studies. In addition, full access to these studies is helping to accelerate innovation, collaboration & avoid duplication as well improving transparency of the scientific process& results. Most notable, the advents of information Communication Technology (ICT) are made possible to access information. Therefore, exploitation of ICT based products & services by libraries, can be broadly valuable in terms of 4 Es, namely economy, ease, extension (or expansion) and efficiency, Chauhan (2004).

It is worth mentioning, only in period of three years IJIDT became a valuable open access journal in LIS society. All credit goes to Chief Editor, Ashok Kumar and his team for their dedication and devotion and time spending on IJIDT.

PARVEJ AHMAD
Web Librarian
Portal & E-Services Department
Deanship of E-Transactions & Communication
King Saud University
Riyadh, Saudi Arabia

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Guest Editorial

I am glad to share some of my views to the readers of "International Journal of Information Dissemination and Technology (IJIDT)" through this Guest Editorial. With current issue, the above journal will complete three years in the field. To me the most impressive part of this journal is timely publication and availability of complete digital archive using open journal system.

The current issue brings to you 14 articles covering various topics such as impact of information technologies on both users and libraries, current status of libraries, information seeking behaviours of users, and information literacy programmes taken up by the libraries to cope up with this new paradigm shift. This issue also contains articles on the concept of knowledge management and information ethics for new generation of library and information professionals. We are moving towards virtual world where virtual learning and virtual libraries will soon become a virtual reality. So the articles concerning virtual learning and applications of cloud computing to libraries may be of interest to you. This issue also presents two very interesting papers on Bibliometric study on Nanotechnology and developing standard on electronic resource management.

In new paradigm shifts due to internet revolution particularly from web 2.0 to 3.0 a new world of virtualization has been emerged. The google was and still a big challenge to the libraries but now real threats to libraries are from cloud computing, and social networking tools with convergence of mobile technology as these have posed new challenges of bringing the people to the libraries. Now time has come to convince libraries that they need people not to convince people that they need libraries. Availability of more and more digital information has further confused the users. However, despite of all above threats, I see a very prominent role for future libraries and librarians. But for that role we need to re-engineer the libraries and also need to re-engineer the custodian image of the librarians to that of a Knowledge Navigator or a Resource Manager. In this new world, it is not important that how many users are coming to your library, more important is how many you are reaching out, wherever they are and providing them right information in a right manner at right time. We need new age professionally managed libraries by the professionally trained librarians. Do we have such professionally trained library professionals? Do we have well equipped library science schools with a course curriculum covering all such issues? With privatisation of technical education in India a large number of seats are available in prime subjects such as management, engineering and medical etc. It is true that despite good job opportunities and pay scales library science has not been stillconsidered as a prime subject so unable to attract attention of the society. Starting of so many library science courses under continuing education and also starting of library science courses by private institutions has further affected the library profession both in terms of quality and quantity. We are at crossroads, so library science education needs to be re-designed to meet these challenges. I am sure this journal will initiate the debate and will try to find out solutions to these challenging and emerging issues so a blueprint for future road map to guide libraries, library science departments and librarians may be prepared.

I would like to express my sincere thanks to Mr. Ashok Kumar, Editor-in-Chief, IJIDT for inviting me to express my views to the readers of this Journal through this Guest Editorial.

DR. RAMESH C GAUR
University Librarian
Jawaharlal Nehru University
New Delhi

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Usage of Consortium for E-Resources in Agriculture (CeRA) by the Faculty of Punjab Agriculture University, Ludhiana: A Case Study

Nav Jyoti Dhingra

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Library Assistant
A.C.Joshi Library
Panjab University
Chandigarh

Corresponding Author
Nav Jyoti Dhingra
navi.pul@gmail.com

ABSTRACT

This study assesses attitudes towards e-journals available through Cera- Consortium and examines the current level of use of these electronic publications by faculty members of the Punjab Agriculture University, Ludhiana. A survey was conducted, using questionnaire to collect data. The paper attempts to define this consortium, its objectives and scope also. This article explores that usage of e-journals has increased as compared to the printed journals as majority of users have started accepting the journals in electronic form. Faculty is accessing these e-journals at their concerned departments more as compared to the library. Their responses and remarks have been presented here.

Key Terms: E-journals, users' attitude, Punjab Agriculture University library, E-resources.

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INTRODUCTION

Journals, whether in print or in electronic format, constitute an important part of a library collection as these are the most important vehicle for global scholarly communication. Due to the growth and expansion of the Internet, e-journals are becoming important information sources for users. Electronic journals are often referred to interchangeably as "Electronic Serials", "Online Journals", "Paperless Journals", "Virtual Journals", "CD-ROM Journals", and "Electronic Journals".

According to ALA Glossary Young (1983). "A journal is a periodical, especially one containing scholarly articles or disseminating current information on research and development in a particular subject fields." If this task is done by an electronic media then it may be called an e-journal.

Lancaster (1995) opined that an "electronic journal is created for the electronic medium and is available only in this medium." In general the e-journal can be defined as a journal that is available in electronic form through online host.

E-journals in libraries are currently getting a great deal of attention as they have features like search capabilities, hyper links, quicker publication and multimedia, which make the text easy to access, search and understand. Academic libraries subscribe to electronic journals to meet their users' expectations and implement the concept of consortia based subscription of e-journals.

LITERATURE REVIEW

In recent years, there has been an increasing amount of literature on the use of e-journals by different kind of user surveys such as conducted by Brennan et.al. (2002) in their study at the University of Illinois, Chicago revealed that all the faculty members, read electronic journals at least weekly and many used them on daily basis. They stated that the users of e-journals accepted them because they see more advantages of e-journals including time saving, ease of use and powerful searching capabilities.

In 2004, Tenpoir et.al. done a study on usage of e-journal by medical faculty of the University of Tennessee Health Science Center (UTHSC), reported that usage of electronic journals gradually becoming important. The electronic journals available to faculties have increased the average reading. The main purpose of the accessing electronic journals is to support the research work. In comparison with usage of print journals medical faculty still continue to rely on the print journals instead of electronic journals. Almost five years later, continue with their study Tenopir et.al. (2009) pointed out how faculty members in science, technology, medicine and social sciences from 1977 to the present in a university, read and used scholarly articles and how this reading pattern has changed with the pervasive accessibility of electronic journals. They found that the average number of readings per year amongst science faculty members continues to increase while the average time spent per reading is decreasing.

Bar-Ilan (2003) conducted a study of the academic staff on their use of databases and electronic journals in the Israeli universities. The major findings were that the electronic sources usage was already prevalent among the respondents and more than 50%

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found the electronic services essential. Most of the respondents (91.7 %) were satisfied with the services provided to them.

In the Indian context a study conducted by Mounissamy et.al. (2005) on research scholars and faculty members of National Institute of Technology, Tiruchirappalli reveals that 33% of faculty members and 67% of researchers frequently access the electronic journals for different purposes. 53.4% of the respondents access 1-3 journals in a month. 26.1% access 3-6 electronic journals in a month. 12.5% access 6-10 electronic journals in a month and 8% access above 10 journals.

Koovakki et.al. (2006) 97 surveyed 50 university teachers and indicated that higher percentage of science and non-science teachers use e-journals for research, teaching and for updating their knowledge. It is evident from their study that availability of e-journals is ranked average.

Madhusudhan (2008) in his study on Use of UGC-Infonet e-journals by research scholars and students of the University of Delhi, Delhi', opined that it appears to be some need for academics to be provided with training in using e-journals. The result showed that most of the (72%) respondents are accessing e-journals through department computer laboratories, 47% accessed from central library. 73% of respondents agreed that print journals are important for the foreseeable future. 64% of the respondents strongly attest to the fact that they need proper training/orientation for searching e-journals. 75% respondents stated that they are accessing UGC Infonet e-journals for current and up-to-date information.

Patil et.al. (2009) in their survey on faculty members and research scholars in Gulbarga University found that 72.01% researchers and 75.50% faculty members search information from the electronic journals. 66.83% of respondents used both the electronic and printed journals. 64.20% of respondents stated that they feel the need of more number of e-journals in UGC-InfoNet consortium. Need of training and orientation programmes was emphasized by 59.19% of respondents to access e-journals.

PROFILE OF PUNJAB AGRICULTURE UNIVERSITY

PAU was established in 1962 to serve the state of erstwhile Punjab. On the reorganization of Punjab, two independent universities for the two states - Punjab and Haryana were established under the Haryana and Punjab Agricultural Universities Act, 1970. Modeled on the pattern of land grant colleges in U.S.A., the PAU performs the integrated functions of teaching, research and extension in agriculture, agricultural engineering, home science and allied disciplines. The University has well equipped laboratories, library and lecture rooms and elaborate farm facilities. At present the University, through 28 departments in the four constituent colleges, offers 31 Master's and 30 Ph.D. programmes in Basic Sciences and Humanities.

M.S. Randhawa Library

The university library was initially started in the college of Agriculture with a meagre collection of 200 books in 1959. It has a central library at the main campus and more than 100 departmental and research station libraries. The motto of the library is that no bonafied reader is allowed to be starved of its rich resources and extend the benefit of information technology through automation and networking. The total library collection is 3,73,749 documents including 2,34,434 books; 1,01,736 bound Periodicals; 348 audio-visuals and 893 CD-ROMs. The Library subscribes to 354 printed journals including 115 foreign and 239 Indian during the current year. Approximately 2000 electronic journals are being accessed by PAU through CeRA Consortium. The library has free access to 50 online journals. Free access to the online databases is also being provided to the members. PAU also subscribes to J-GATE which provides seamless access to the abstracts of millions of journal articles available online offered by more than 4800 publishers. Users can access the databases at the PAU library homepage http://web.pau.edu/msrlibrary/

Consortium for e-Resources in Agriculture (CeRA)

The National Agricultural Innovation Programme (NAIP) has established the Consortium for e-Resources in Agriculture (CeRA) with the support of Indian council of Agriculture Research (ICAR) at the Indian Agricultural Research Institute (IARI), New Delhi. The establishment of CeRA under NAIP is a part of the ongoing activities of the unit of simulation and informatics (USI) set up in November 2003 by merging the unit of Applications System Simulation (UASS), the Bioinformatics Centre and Internet Facilities.

Use of CeRA

- To develop the existing R & D information resource base of ICAR institutes/universities, etc., comparable to that existing in world leading institutions/organizations.
- To create an e-access culture among scientists/teachers in ICAR institutes/agricultural universities.
- To develop a Science Citation Index (SCI) facility at IARI for evaluation of scientific publications.
- To assess the impact of CeRA on the level of research publications measured through SCI.

CeRA-Consortium provides access to 2000+ journals (electronic and Print) from several publishers from the following sources.

- 200+ print journals from designated document delivery libraries;
- 1800+ e-journals from the following participating publishers.

It covers six major subject fields including Agricultural & Biological Science; Arts & Humanities; Basic Sciences; Biomedical Sciences; Engineering & Technology (JET); Social & Management Sciences.

Table 1: Full-Text e-Resources

S. No	Publishers	No. of Journals
1	Annual Reviews	22
2	CSIRO	08
3	Springer	1190
4	Informatics(open J-gate)	613

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OBJECTIVES OF THE STUDY

- To know the usage of CeRA-Consortium e-journals by the faculty members in the Punjab Agriculture University, Ludhiana.
- To analyze the awareness of e-journal consortia among faculty members.
- To assess the satisfaction level of faculty members in using e-journals.
- To identify the preference of e-journals over printed journals.
- To identify the features of the e-journals.
- To find out the major hindrances in the usage of e-journals.
- To assess their attitude towards e-journals in future.

SCOPE OF THE STUDY

Present assessment has been made by surveying the usage of the e-journals of CeRA- Consortium by faculty of Punjab Agriculture University (PAU), Ludhiana, using a questionnaire method. The Punjab Agricultural University has four constituent colleges, viz. College of Agriculture, College of Agricultural Engineering, College of Home science and College of Basic Sciences & Humanities. A total sample of 362 faculty members was chosen from 2 colleges that are College of Agriculture (304) and College of Agricultural Engineering (58). To have an accurate idea, it was decided to include the full population as the sample and the questionnaire were distributed to all 362 faculty members. Of these, 280 questionnaires were received back and out of them 244 questionnaires were selected for analysis of data. The remaining were excluded due to incomplete data. The final response rate was 67%.

LIMITATIONS OF THE STUDY

The present study aim is to find the usage level of e-journals among faculty in PAU. The investigator was able to identify some of the major limitations, such as

- The present study consists of only the e-journals users.
- The geographical area is restricted to faculty members of PAU, only.

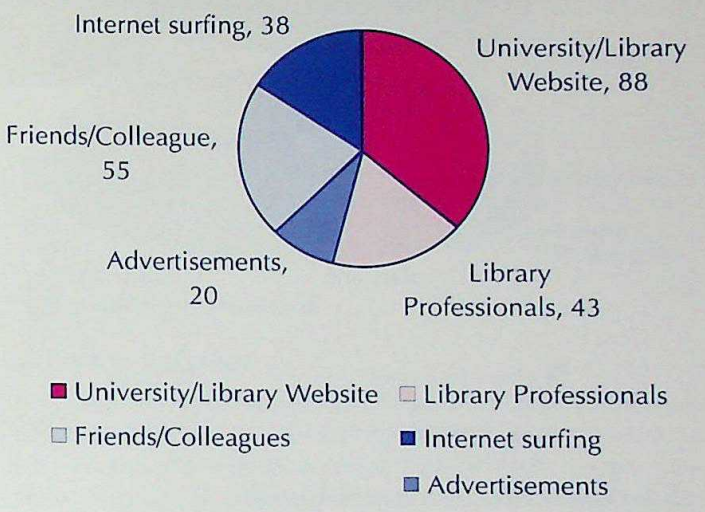
ANALYSIS & INTERPRETATION

The data collected by the above mentioned methods were analyzed and inferences made based on standard statistical techniques. Analysis of the data obtained through the questionnaires provided an in-depth interpretation for fulfilling the research objectives.

Source through which Consortium is known

It is noted that there are different sources through which the faculty comes to know about the availability of e-journals. These include library website, library professionals, colleagues, advertisements or through web surfing. Figure 1 indicates the response of the users regarding the source through which they got information about the availability of e-journals. 36.06 percent respondents stated that University/library websites is the major source from where they got the information about e-journals, whereas 22.54% respondents got information from their friends and colleagues. Internet surfing and advertisements are the source of information for 15.58% and 8.21% respondents respectively. 17.62% respondents reveal that the library professionals informed them about the e-journals in their fields.

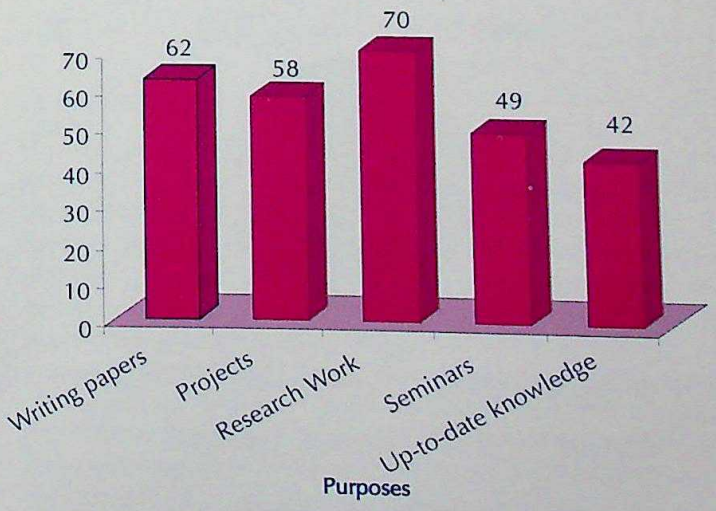
Figure 1. Sources of information about E-journals



Purpose of using e-Journals

Figure 2 shows the purpose of using e-journals. It is evident from the figure that majority of respondents i.e., 28.69%, use e-journals for their research work. 23.77% faculty use e-journals for their project works and 25.40% faculty consult e-journals for writing papers. For 20.08% faculty, e-journals are also being used for preparing the seminars, followed by 17.21% faculty who make their knowledge up to date after consulting e-journals.

Figure 2. Purpose of using e-journals



Frequency of use of CeRA-Consortium e-Journals

It is essential to know how much time on an average the target user is spending in accessing e-journals, since it will be the essential point around which all the responses will be analyzed.

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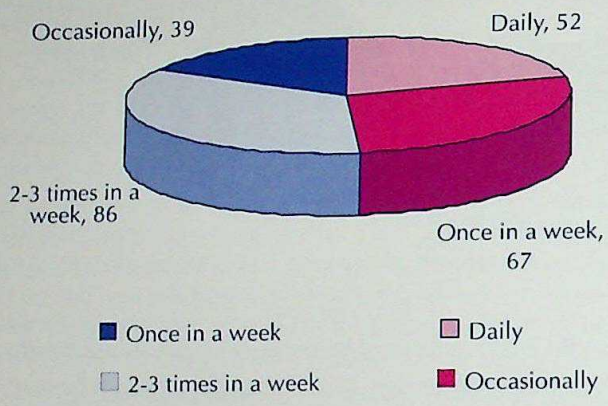
When enquiring about the frequency of faculty members use e-journals, 35.24% claimed to use them 2-3 times in a week, 27.46% used them once in a week, 21.31% used them daily, and few (15.98%) used e-journals occasionally (see Figure 3). Thus it can be concluded that most of the faculty members used e-journals 2-3 times in a week.

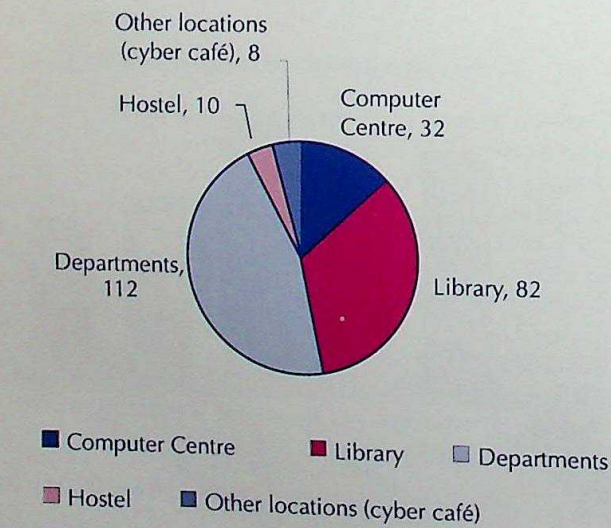
Figure 3. Frequency of use of CeRA-Consortium e-journals



❑ Access of CeRA-Consortium e-Journals

Users were asked as to places where they access e-journals. Figure 4 summarizes that most of the (45.9%) faculty prefer to access e-journals from their concerned department only, while one third (33.6%) of the faculty members prefer to e-journals in library. 13.11% prefer to access the same in computer centre. Very few members i.e. 4% and 3% access the e-journals from hostels and cyber café respectively.

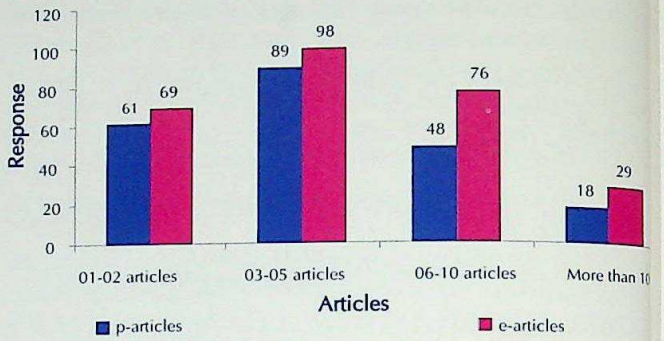
Figure 4. Access of CeRA-Consortium e-journals



❑ Usage of Printed and Electronic Journals

Figure 5 depicts that in spite of e-journals being omnipresent, print journals have not lost their importance. 36.47% faculty still consult 3-5 printed articles (p-articles) in a week and 40.17% faculty consult 3-5 electronic journals' articles (e-articles) in a week. 31.14% faculty consults 6-10 e-articles in comparison t 19.67% faculty who consult 6-10 p-articles in a week. A fe (7.37%) prefer to consult more than 10 p-articles in a wee whereas 11.9% faculty consults more than 10 e-articles.

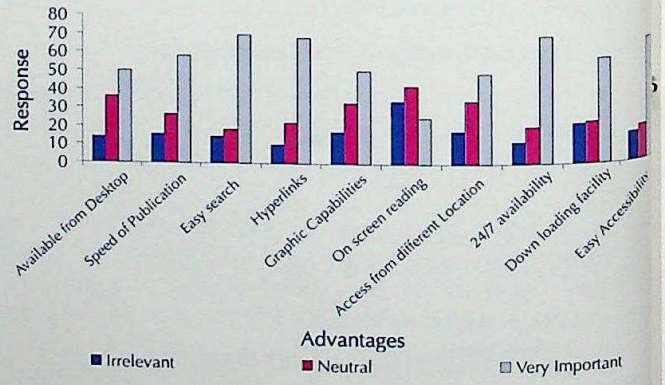
Figure 5. Usage of Printed and Electronic Journal Articles



❑ Advantages of Electronic Journals

The respondents were asked to indicate the features of use of e journals. Several specific advantages were given an respondents' were asked to indicate them as very importan Neutral and irrelevant. As can be seen in figure 6, 'easy search '24/7 availability' and 'hyperlink' features of e-journals foun very important by 69.27%, 68.03% and 67.63% respondent respectively. 41.08%, 36.06% and 32.79% respondents wer neutral about the features like 'on screen reading', 'availabili from desktop' and 'graphic capabilities' of the e-journa respectively. 'Downloading facility', 'access from differen locations' and 'speed of publication' features were indicate irrelevant by 21.31%, 17.62% and 15.57% respondent respectively. 65.57% respondents found 'easy accessibility' ver important whereas 18.86% respondents were neutral about it an 15.57% respondents indicate this feature irrelevant.

Figure 6. Advantages of Electronic Journals



❑ Problems faced while accessing e-journals:

Even though e-journals are very important source of informatio there are some problems faced by the users. Lack infrastructure, lack of training, difficult to read from screen, e are some of them. So the faculty was requested to furnish deta regarding the problems faced while accessing e-journals (s figure 7). More than one third (38.52%) faculty found lack

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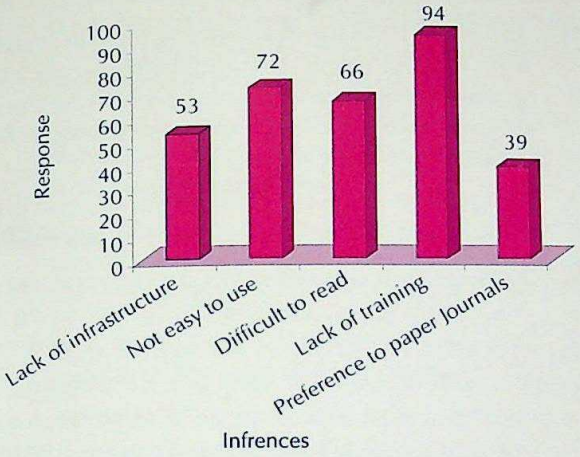
training as the major problem of not using or less usage of e-journals. 29.5% faculty found e-journals are not easy to use while 27.04% found e-journals are difficult to read from screen. Lack of infrastructure for accessing e-journals was also found to be a barrier by 21.72% respondents. 15.98% faculty gave preference to paper journals.

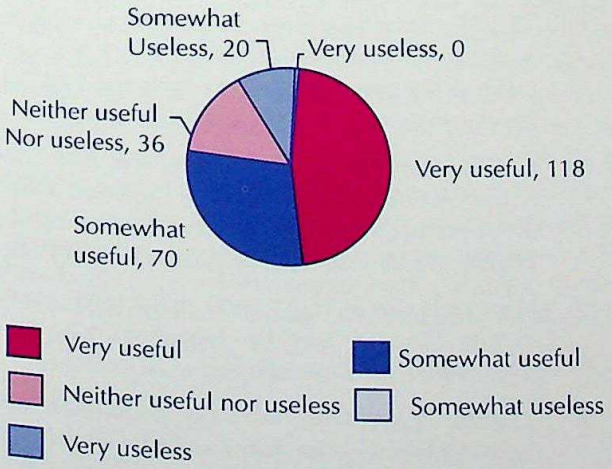
Figure 7. Hindrances in Using E-Journals



Rating of Library Web Page

As it is clear from the figure 4 that library webpage or website played a very important role in spreading awareness among faculty members regarding accessibility of e-journals. Figure 8 reveals how faculty of PAU rates their library webpage. Almost half 48.36% faculty found their library webpage very useful whereas 29 % respondents found the same somewhat useful. Very few 8.2% found this somewhat useless and no faculty member found their library web page useless.

Figure 8: Rating of Library Web Page



Satisfaction with Availability of e-Journals

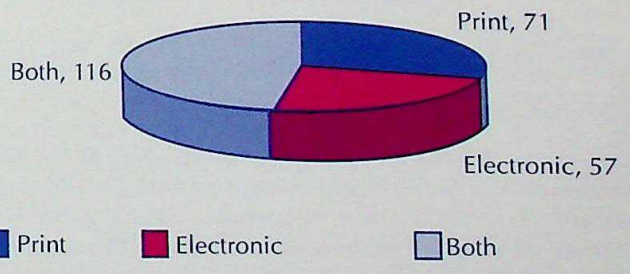
Faculty was asked whether they are satisfied with the number of e-journals available in the library. Figure 9 shows that 28.28% respondents were somewhat satisfied with the total number of e-journals available. Where as 14.34% faculty fully satisfied with the availability of e-journals. A very few (8.2%) faculty was dissatisfied with the number of e-journals available in their university.

Figure 9: Satisfaction with Availability of e-journals

Preference of Usage

A preferential analysis was conducted to check users' preference to print or electronic journals (see figure 10). In spite of e-journals were flourished in a good wave still 29% of faculty under study prefer to consult printed journals where as 23.36% faculty gave preference to the electronic journals. The analysis reveals that almost half (47.54%) of the faculty give preference to both types of journals print as well as electronic, they found them equally important.

Figure 10: Preference of Usage



Improvement in E-Journals' Facility

Figure 11 reveals as to how the facility of e-journals can be made more efficient. More than one third of the respondents (35.24%) quoted that by providing more training programmes, the e-journals usage can be improved. 22.95% respondents felt that by improving the infrastructure for accessing e-journals, the accessibility can be increased. Almost one third faculty (32.37%) suggested that usage of electronic journals can be improved by improving the speed of Internet. As users are not properly aware of e-journals, 17.62% faculty indicated that by adopting promotional strategies, e-journals' usage can be increased. Some electronic journals have the access to the limited number of users, according to 24 (9.83%) respondents revealed that by providing access to unlimited number of users, the usage can improve. 17.21% respondents stressed that good co-operation from the staff can play a very important role in improving the e-journal usage.

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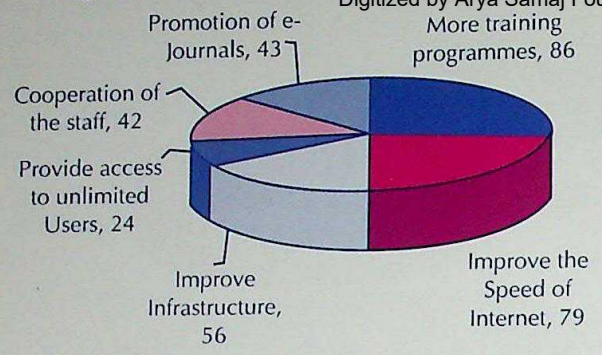
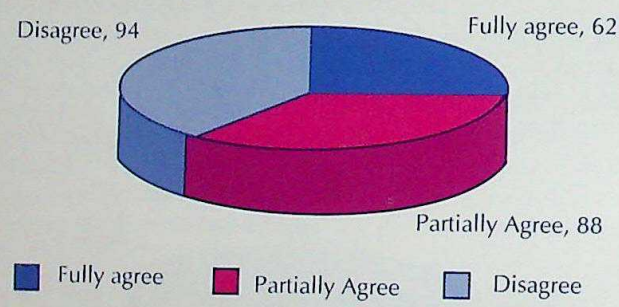
Figure 11: Improvement in e-Journals Service



Print Vs E-Journals: Future Perspective

Figure 12 enumerates the assessment of faculty regarding strength of electronic journals in fully replacing the printed journals. The data analysis reveals that 25.41% respondents fully agree with the statement that e-journals can replace the printed journals. More than one third (38.52%) respondents disagree with the statement that e-journals can fully replace the printed journals. Whereas rest one third respondents were partially agree with this statement.

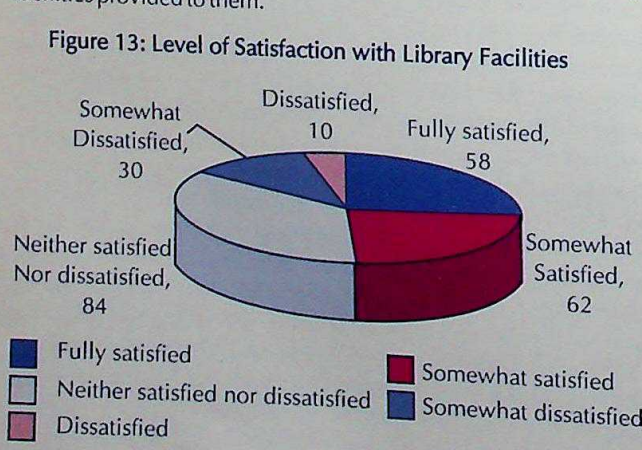
Figure 12: Print vs e-Journals



Satisfaction Level with Library Facilities

At what extent the PAU faculty is satisfied with the facilities provided by the library for accessing e-journals (see figure 13). One forth (25.41%) faculty is some what satisfied with the library facilities. Little more than one third (34.43%) respondents expressed the neutral behavior, neither are they satisfied nor dissatisfied with library facilities. Where as 23.78% of faculty is fully satisfied. 12.29% faculty shows somewhat dissatisfaction and very few (4.09%) faculty thoroughly dissatisfied with library facilities provided to them.

Figure 13: Level of Satisfaction with Library Facilities



FINDINGS

- University/Library website and Friends or Colleague are the sources of information about the availability of journals for 36.06% and 22.54% faculty respectively.
- Departments are the centralized place for accessing journals for 45.9% faculty. 33.61% faculty stated th they access e-journals from library also.
- Faculty seems to use the electronic journals to suppo their research needs mainly. 28.69% faculty use journals for their research work. E-journals are also use for project works by 23.77% users, for writing papers b 25.4%.
- Majority of PAU faculty (45%) access e-journals once i a week and one third use e-journals 2-3 times in a week
- By the analysis of data it seems that electronic and prin articles were going side by side for the PAU faculty. On third faculty consults 3-5 p-articles in a week whil 40.17% faculty consults 3-5 e-articles in a week.
- 69.27% and 68.03% respondents found 'easy search and '24/7 availability' respectively as very importan features of electronic journals.
- 38.52% faculty indicated that 'lack of training' is th major cause of less usage of e-journals, followed by 'difficult to read from screen' (27.04%), 'lack o infrastructure' (21.72%), 'preference to paper journals (15.98%) and 'not easy to use' (29.5%).
- Almost half (48.36%) respondents found their librar webpage very useful for accessing and providing knowledge about the e-journals of their subject field.
- 28.28% faculty were 'somewhat satisfied' with th available number of e-journals for them in their library.
- 47.54% respondents prefer to use print journals as we as the electronic journals. Whereas 23.36% of user prefer to use only electronic journals and 29% of user feel comfortable in using print journals only.
- 38.52% respondents believed that electronic journal would co-exist with print journals in future. One fort believed that electronic journals would replace the prin journals (32.29%) or would supplement (37.71%) them
- More than one third (35.24%) of the total populatio studied revealed that by providing more training programmes, the e-journals usage can improve.
- 23.78% respondents of total population studie indicated that they are fully satisfied with the facilitie available in the PAU for accessing e-journals. One fort faculty was somewhat satisfied with the facilitie provided to them for accessing e-journals.

SUGGESTIONS

Based on the findings of the study, the following suggestions ar put forward to improve the use of CeRA-Consortium e-journal among the faculty of PAU:

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- Alphabetical and classified list of e-journal titles available on the library web page be constantly updated so that the users come to know about their current status of their availability.
- Advertisements regarding the available e-journals in university and library newsletters.
- Authorities of all the universities must ensure better computer infrastructure facilities like improvement of Internet speed, enough number of workstations with Internet connectivity, laser printers etc.
- Necessary arrangements should be made in the form of high-power UPS for uninterrupted power supply so that service can be provided fully.
- One of the important features of e-journals is accessibility at various locations. But in case of Indian universities this very purpose is forfeited as access to e-journal is provided within the university premises. Libraries must evolve some mechanism to provide access to e-journals beyond the four walls of the university campuses.
- The libraries should check the usage statistics from the publishers. The role of usage statistics in electronic journal subscription is important.
- Electronic journals require more promotional activities than is currently taking place in university libraries surveyed.
- Evaluation of e-journals should be a regular feature for university libraries, so that individual titles which are not in much demand can be cancelled.

CONCLUSION

Electronic journals are an invaluable source of up-to-date scholarly information. These clearly allow for the rapid distribution of scholarly information at a reduced cost and provide many exciting opportunities and potentials for user community and academic libraries. Present study reveals its impact in terms of awareness and effective use of the CeRA-Consortium e-journals, with a few constrains reported by the respondents. To conclude the major challenges, these libraries face are lack of awareness, proper training among the users and less infrastructure for maximum usage of e-journals. The librarians must check out the reasons for this decrease in usage and find out the users who use them, so that they can be guided for using such e-journals.

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Attitudes of Young Adults Towards Public Library Services: A Study

Jaya Kumara* and Khaiser Nikam**

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*Research Scholar and Librarian
Government First Grade College,
Chamarajanagar
Karnataka

** Professor and Chairperson
Dept. of LIS
University of Mysore
Manasagangotri, Mysore

Corresponding Author
Jaya Kumara
jayakumargfgc@gmail.com

ABSTRACT

The present study provides a glimpse of the young adult public library (YAPL) users' attitudes and their perception about the public library services in Southern Karnataka. The main objectives of the study are: (i) to know the profile of the YAPL users,(ii)to ascertain the purpose for which they visit the library,(iii)to determine the attitudes of the respondents towards quality of library staff,(iv)to identify the perception of YAPL users towards reading different types of fiction,(v) to know their opinion about library collection and lastly(vi) to determine their attitudes towards services and facilities of public libraries in Southern Karnataka. For the purpose of data collection a structured questionnaire was distributed to 500 YAPL users between 15 to 40 years of age in five Central Libraries located in Mandya, Mysore, Tumkur, Hassan and Bangalore of southern Karnataka. Of the sample selected a sum of 384 valid responses were received. For analyzing the data simple statistical techniques like mean, standard deviation and chi-square tests were used. The result of the study indicate that about 35.4% of respondents are between 21-25 year of age, majority (77.6%) of YAPL users are male, and more number of respondents visit the library daily representing 51.7%. The chi-square test shows that there is a significant difference between the frequencies of responses of YAPL users, hence the null hypotheses are rejected and formulated hypotheses of the study are accepted.

Key Terms: Public Library, Public Library Services, Young Adults, Attitudes, Perception, Impression.

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INTRODUCTION

A public library is popularly known as a People's University. It is a center of community services, information bureau, and training school for democracy. It renders valuable services in molding the life of all the library users. According to the e UNESCO Manifesto (1994) 'public library is a living force for education, culture and information and an essential agent for the fostering of peace and understanding between people and between nations'. The manifesto also proclaims that "the public library as a democratic institution operated by the people for the people, should be established and maintained under the clear authority of law; supported wholly or mainly from public funds; open for free use on equal terms to all members of the community regardless of occupation, creed, class or race". The service concept of 'Youth as Persons' was put forward by Adkins & Higgins (2006) as the most demonstrable feature in curriculum studies of youth services librarianship. In many respects youth librarians have the responsibility to make libraries hospitable and inclusionary place for young people.

Nowadays every organization is concerned with satisfying th users by creating several products or services. In the same way th public libraries aim to satisfy the young adult public library (YAP users by providing various services like lending service, referenc service, career information, free internet service and young adu advisory service etc. For many years, librarians have use surveys, interviews, and observation to measure user satisfactio with public library services and programs regularly. Therefor studying the attitudes of YAPL users is an essential to know wha the YAPL users expect and what do they think of the public librar services.

OBJECTIVES

The present study is being taken keeping in view of the followin objectives:

- To know the profile of the YAPL users,
- To ascertain the purpose for which they visit the library,
- To determine the attitudes of the respondents toward quality of library staff,

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- To identify the perception of YAPL users towards reading different types of books
- To know their opinion about library collection and lastly
- To determine their attitudes towards overall public library services and facilities.

METHODOLOGY

The survey method is used for the collection of the data required for the present study. The structured questionnaire was designed in both Kannada and English language to get good response from the YAPL users between 15 to 40 years of age. To collect data random sampling method was used and 100 questionnaires each were distributed to five main city central libraries located in Mandya, Mysore, Tumkur, Hassan and Bangalore of Southern Karnataka. All together 500 questionnaires were distributed and 384 filled questionnaire were obtained with a response rate of 76.8%. Simple statistical techniques like averages, mean, standard deviation and chi-square tests are used for analysis of data.

SCOPE & LIMITATIONS

The scope of the present study is limited to City Central Libraries located in five districts of Southern Karnataka they are Mysore, Mandya, Hassan, Tumkur, and State Central Library in Bangalore. The limitation of this study is that, only main central library in each district is cov ered and excludes branch libraries.

HYPOTHESES

The following hypotheses are framed for the study:

H_1: There is a significant difference between the frequencies of responses of YAPL users towards the purpose of library visit.

H_2: There is a significant difference between the frequencies of responses of YAPL users and reading different types of books

H_3: There is a significant difference between the frequencies of responses of YAPL users and public library services.

H_4: There is a significant difference between the frequencies of responses of YAPL users and quality of library staff.

H_5: There is a significant difference between the frequencies of responses of YAPL users and public library collections

PAST STUDIES

Some of the previous studies on users attitudes towards public library services are presented here. Haman (1986) has carried out a study on reader's behavior in public libraries. England (1994) has made a study reading habits and attitudes of public library users in Great Britain. Nikam & Chandrashekar (2007) conducted a study entitled 'expectations and perceptions of the users of public libraries in Mysore city: A survey', the results of the study shows that more number of respondents were between 21-25 years of age, and users were satisfied with library services. Perumal & Kaliyapermal (2012) report user perceptions and attitudes towards the resources and services of District Central Library, Kancheepuram District in this study also majority of respondents are between 21-25 year of age group and regarding perception on library resources and services majority of respondents say satisfied.

RESULTS & DISCUSSION

The results of the YAPL users' attitudes and perception towards public library services in Karnataka are shown below.

Age wise Breakup of YAPL Users

The Age of the young adult public library users is arranged in different ages ranging between 15 to 40 years. The Age wise distribution of YAPL respondents is shown in table 1. It is clear from the table that a considerable number of the respondents are in the age group of '21 - 25 years' representing 35.4 percent. The respondents between the age group of 26-30 years scoring 33.1 percent are the second largest. About 12.2 percent of young adult public library users fall into the age group of 31 - 35 years. A very few respondents representing 12 percent are under age group of 15 - 20 years. Only 7.3 percent of them fall under 36-40 years age group.

Table 1: Age wise Breakup of YAPL Users

Range of Age	No. of Responses	%age
15-20	46	12.0
21-25	136	35.4
26-30	127	33.1
31-35	47	12.2
36-40	28	7.3
Total	384	100

Gender wise Breakup of YAPL Users

The gender wise break up of YAPL users is shown in table 2. It may be seen from the table that majority of the respondents numbering 298 (77.6 %) are male and the remaining 86 (22.4%) are female respondents.

Table 2: Gender wise Breakup of YAPL Users

Gender	No. of Responses	%age
Male	298	77.6
Female	86	22.4
Total	384	100

Educational Qualifications YAPL Respondents

The young adult public library users come from different educational background. The educational qualification of the YAPL respondents is presented in table 3. The table shows that, of the 384 respondents, nearly 172(44.8%) users are UG degree holders. Whereas122 respondents representing 31.8 percent are PG degree holders. About 50 (13%) respondents have P.U.C

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qualification; a few 27 (7%) respondents have S.S.L.C qualification, and 11 YAPL users representing 2.9 percent having other qualifications. Only 2 (0.5 %) of them are doctorate degree holders.

Table 3: Educational Qualifications YAPL Respondents

Educational Qualification	No. of Responses	%age
S.S.L.C	27	7.0
P.U.C	50	13.0
UG Degree	172	44.8
PG Degree	122	31.8
PhD	2	0.5
Any Other	11	2.9
Total	384	100

❑ Occupation of YAPL Respondents

The young adult public library users have different occupation. Table 4 shows the occupation wise breakup of responses. It is observed from the table that, majority accounting 140 (36.5%) of YAPL users are students. Nearly 67 (17.4%) respondents are unemployed. About 63 (16.4%) respondents are Government employees, it is followed by housewives accounting 50 (13%), Private employees 49(12.8), and any other occupation representing 12 (3.1%). Only 3 (0.8%) of them were businessman.

Table 4: Occupation of YAPL Respondents

Occupation	No. of Responses	%age
Student	140	36.5
Govt. employee	63	16.4
Private employee	49	12.8
Businessman	3	0.8
House wife	50	13.0
Unemployed	67	17.4
Any Other	12	3.1
Total	384	100

❑ Marital Status of YAPL Respondents

Marital status of YAPL respondents are shown in table 5. It is found that, from 384 responses majority scoring 325 (84.6 %) of users were unmarried and remaining 59 (15.4 %) respondents were married.

Marital Status	No. of Responses	%age
Unmarried	325	84.6
Married	59	15.4
Total	384	100

❑ Geographical Area of YAPL Respondents

The geographic area from which the YAPL respondent hail is shown in table 6. It may be seen from the table that out of 384 respondents, a large number of them representing 171 (44.5%) were from the city area, about 160 (41.7 %) respondents from the nearby villages and the remaining 53 of them are from nearby town representing 14.2%.

Table 6: Geographical Area of YAPL Respondents

Geographical Area	No. of Responses	%age
Nearby Village	160	41.7
Nearby Town	53	13.8
From the City	171	44.5
Total	384	100

❑ Frequency of Visit

The frequency of visit to the library by the YAPL respondents is shown in table 7. The table reveals that 199(51.7%) respondents visit the library daily. About 65(16.9%) respondents visit the library twice a week. Nearly 57(14.8%) respondents visit public library once in two days. Only 36(9.5%) YAPL users visit library once a week. It is followed by once in a fortnight representing 14(3.7%), rarely 11(2.9%) and 2 respondents visit once in a month scoring 0.5%.

Table 7: Frequency of visit to the Library

Frequency of visit	No. of Responses	%age
Daily	199	51.7
Once in two days	57	14.8
Twice a week	65	16.9
Once a week	36	9.5
Once a fortnight	14	3.7
Once a month	2	0.5
Rarely	11	2.9
Total	384	100

❑ Purpose of Library Visit

The purpose of library visit by YAPL users is presented in table 8. It may be seen from the table that the main purpose for which the YAPL users visit the library is 'to use newspapers/magazines and journals' with mean value of 4.04 and SD being 1.15. 'To prepare for competitive exam and quizzes' (mean=4.00; SD=1.27) ranks second. 'To read textbooks and other reading materials' (mean=3.90; SD=1.16), ranks third. This is followed by 'To read reference books' (mean=3.81; SD=1.25), to 'Obtain information needed for jobs/career' (mean=3.72; SD=1.29), to 'Obtain information on personal interests, hobbies' (mean=3.63; SD=1.22), 'To borrow books' (mean=3.35; SD=1.44), 'To read own reading material and college notes' (mean=3.28; SD=1.38) and 'To find answers for reference queries' (mean=3.06; SD=1.36).

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Table 8: Purpose of Library Visit

Purpose of Visit	Mean	SD
To borrow books	3.35	1.44
To read reference books	3.81	1.25
To read textbooks and other reading materials	3.90	1.16
To use newspapers/magazines and journals	4.04	1.15
Obtain information on personal hobbies interests,	3.63	1.22
To read own reading material and college notes	3.28	1.38
To avail interlibrary loan service	2.58	1.40
To find answers for reference queries	3.06	1.36
To use internet	2.59	1.40
To use audio visual material	2.34	1.33
To attend a library program	2.68	1.38
To use Xerox and photocopying service	2.40	1.37
To meet friends and relax	2.35	1.40
To meet library staff	2.32	1.35
To use young adult section	2.61	1.37
To use children's section	2.52	1.38
Obtain information needed for jobs/career	3.72	1.29
To prepare for competitive exam and quizzes	4.00	1.27
Chi- Square and P Value	**2 = 320.0; P < 0.001**	

Codes: SD = Standard deviation, 2 = Chi-Square, P = Probability, P?.050 - Significant,

P > .050 - Not Significant

The YAPL users visit library moderately for the purpose 'To attend a library program' with mean value of 2.68 and SD being 1.38. The next highest purpose is to use young adult section having mean value of 2.61 and SD being 1.37. It is followed by 'To use internet' (mean=2.59; SD=1.40), 'To avail interlibrary loan service' (mean=2.58; SD=1.40), 'To use children's section '(mean=2.52; SD=1.38), 'To use Xerox and photocopying service' (mean=2.40; SD=1.37), and to meet friends and relax with mean value of 2.35 and SD being 1.40. The second lowest ranking purpose is 'To use audio visual material' (mean=2.34; SD=1.33), and 'To meet library staff' was the least preferred purpose with mean value of 2.32 and SD being 1.40.

Hypothesis Evaluation

Attitudes towards purpose of library visit, the 2 test indicate that there is significant differences (2=320.0; P<0.001) are observed between the frequencies of responses YAPL users. Hence, the null hypothesis is rejected and research hypothesis formulated - "There is a significant difference between the frequencies of responses of YAPL users towards the purpose of library visit" is supported.

❑ Perceptions on Reading Different Types of Books

The young adults public library users are interested in reading various types of books The perceptions of the respondents about reading different types of books is shown in table 9. The table depicts that majority of YAPL users are interested in reading 'Historical fiction' with highest mean value of 3.63 and SD being 1.31. To read book of 'Adventure and survival' ranks second with mean value of 3.58 and SD of 1.33. It is followed by 'Sports' (mean=3.46; SD = 1.34), 'Science fiction' (mean=3.36; SD = 1.29), 'Mystery/suspense' (mean=3.31; SD = 1.28) and 'Realistic teen novels' with mean value of 3.18 and SD being 1.30.

Table 9: Perception on Reading Different Types of Books

Types of Books	Mean	SD
Horror	3.03	1.30
Realistic teen novels	3.18	1.30
Mystery/suspense	3.31	1.28
Romance	2.83	1.40
Science fiction	3.36	1.29
Fantasy	3.03	1.30
Sports	3.46	1.34
Adventure and survival	3.58	1.33
Historical fiction	3.63	1.31
Classics in paperback editions	3.10	1.32
Chi- Square and P Value	2 = 297.8; P < 0.001	

Codes: SD = Standard deviation, 2 = Chi-Square, P = Probability, P?.050 - Significant,

P > .050 - Not Significant

The YAPL users are also interested in reading 'Classics books' with mean value of 3.10 and SD being 1.32. The 'Horror' and 'Fantasy' books are second lowest preference books with mean value of 3.03 and SD being 1.30 each and 'Romance' books were least preferred by YAPL users with lowest mean value 2.83 and SD being 1.40.

Hypothesis Evaluation

Regarding perception on reading different types of fiction books, the Chi-Square test indicate that there is significant differences (2=297.8; P<0.001) are observed between the frequencies of responses. Hence, the null hypothesis is rejected and research hypothesis formulated - "There is a significant difference between the frequencies of responses of YAPL users on reading different types of books" is supported.

❑ YAPL users Impressions towards the Library Collection

Public library have good library collection which includes text books, reference books, novels, periodicals etc. the YAPL users'

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impressions towards the collections of the public library is shown in table 10. It is clear from the table that, YAPL users were higwith the 'Reference books' (e.g. encyclopedias, dictionaries etc) with highest mean value of 3.87 and SD being 1.02. The second impressed collection were 'Competitive exam books' (mean=3.74; SD=1.20). It is followed by 'Journals' (mean=3.68; SD=1.13), 'Text books'(mean=3.67; SD=1.24), 'Science fiction' (mean=3.67; SD=1.05) and 'General Magazines' (mean=3.66; SD=1.21).

Table 10: Impressions towards the Library Collection

Collection	Mean	SD
Text books	3.67	1.24
Competitive exam books	3.74	1.20
Reference books (e.g. encyclopedias, dictionaries etc)	3.87	1.02
Journals (Periodical in your subject)	3.68	1.13
General Magazines (ex. India today, Week, Sudha etc)	3.66	1.21
Broachers	3.18	1.23
Posters	3.20	1.19
Comic books (Ex. Panchatantra, Archie's etc)	3.06	1.21
General Fiction	3.62	1.08
Science fiction	3.67	1.05
Brail Material	2.94	1.34
Graphic novels	3.03	1.25
Non print collections ex; audio book, and CD's etc.	2.03	1.15
Chi- Square and P Value	2 = 313.8; P < 0.001	

Codes: SD = Standard deviation, 2 = Chi-Square, P = Probability, P?.050 - Significant,

P > .050 - Not Significant

The other collection of the library like 'General fiction' (mean=3.62; SD=1.08), 'Posters' (mean=3.20; SD=1.19) and 'Brochures' (mean=3.18; SD=1.23) were also used by YAPL users. This is followed by 'Comic books' (mean=3.06; SD=1.21), 'Graphic novels' (mean=3.03; SD=1.25 'Brail materials' (mean=2.94; SD=1.34), and 'Non print collections like Audio books, CD's etc.' (mean =2.03 and SD = 1.15) are also used by the respondents.

Hypotheses Evaluation

The 2 test indicate that there is significant differences (2=313.8; P<0.001) are observed between the frequencies of responses of YAPL users towards library collection. Hence, the null hypothesis is rejected and research hypothesis formulated -"There is a significant difference between the frequencies of responses of YAPL users towards public library collections" is supported.

❑ Opinion of YAPL Users towards Quality of Library Staff

The library staff should have certain special qualities to ser young adults, the opinion of YAPL users towards the quality library staff is shown in the Table 11. We can observe form th table that 'General attitude of library staff towards readers' is goo with a mean value of 3.86 and SD being 2.81. The parameter th 'Ability to motivation the users'(mean= 3.51; SD= 1.20), by th librarians in public libraries ranks second. This is followed b 'Performing services in a right manner' (mean= 3.49; SD= 1.21 'Etiquette and good manner towards reference service' (mean 3.48; SD= 1.12), and 'To answer users questions' rank third four and fifth. The factors, 'Readiness to respond to user's request' an 'Ability to quickly provide service' users with mean value of 3.4 each rank sixth and seventh. The 'Knowledge of media' (mean 3.44; SD= 1.10), and 'Dependability in handling user's problem (mean= 3.48; SD= 1.12) and 'Knowledge of cultural interests young adults' rank lowest with a mean value of 3.29 and SD bein 1.13.

Table 11: Opinion of YAPL Users towards Quality of Library Sta

Opinion towards Library Staff	Mean	SD
General attitude of library staff towards readers	3.86	2.81
Knowledge to answer users questions	3.47	1.20
Knowledge of media (books and resources in all formats)	3.44	1.10
Knowledge of cultural interests of young adults	3.29	1.13
Etiquette and good manner towards reference service	3.48	1.12
Readiness to respond to users request	3.47	1.17
Dependability in handling user's problems	3.42	1.09
Performing services in a right manner	3.49	1.21
Ability to motivation the users	3.51	1.20
Ability to quickly provide service	3.47	1.21
Chi- Square and P Value	2 = 276.0; P < 0.001	

Codes: SD = Standard deviation, 2 = Chi-Square, P = Probabili P?.050 - Significant,

P > .050 - Not Significant

Hypotheses Evaluation

The 2 test indicate that there is significant differences (2=276. P<0.001) are observed between the frequencies of responses YAPL users towards quality of library staff. Hence, the nu hypothesis is rejected and research hypothesis formulated "The is a significant difference between the frequencies of responses YAPL users and quality of library staff" is supported.

❑ Attitude of YAPL Users towards Public Library Services an Facilities

The attitude of YAPL users towards public library services an facilities is shown in table 12. It is clear from the table that major

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(mean=4.11; SD=1.09) of young adults public library users are highly impressed with 'Library opening hours' scoring mean value of 3.94 and SD being 1.19. The factor 'Providing reference information' (mean=3.71; SD=1.14) ranks second. The respondents also feel good about 'Information on notice boards regarding new books, magazines, and news papers' (mean=3.59; SD=1.23). This is followed by 'Library rules and policies for young adults' (mean=3.47; SD=1.16), 'Arrangement and proper shelving of books' (mean=3.46; SD=1.19) and 'Providing services to young adults' (mean=3.43; SD=1.18). The YAPL users also carry good opinion about 'Availability of reading materials' (mean=3.42; SD=1.28). 'Availability of information for generating new ideas' (mean=3.39; SD=1.18). The factor 'Timely document delivery' (mean=3.38;SD=1.14), and 'Easy and convenient access to library collection' (mean=3.36; SD=1.23), 'College and career information' (mean=3.35;SD=1.17), 'Encouraging them to use the collection in all formats' (mean=3.30; SD=1.21), and 'Providing public awareness to young adults about library services' (mean = 3.21 and SD = 1.29) are also appreciated by the respondents

The respondents also have very high regards for other facilities like 'Employment programs for young adults' (mean = 3.15 and SD = 1.30) and 'Co-operation with other professional and voluntary institution' (mean=3.14; SD=1.22). 'Attractive library borrowing system' (mean=3.04; SD=1.32), 'Ability to obtain materials from other libraries' (mean=2.99; SD=1.36), 'Giving personal attention to users' (mean=2.97; SD=1.33) have a pride of place among the respondents. The activities like 'users training programs' (mean = 2.95 and SD =1.33) and 'Drug, alcohol and sex information' (mean = 2.80 and SD =1.35) organized for the YAPL users are somewhat liked by them.

Hypotheses Evaluation

Regarding the attitudes of YAPL users towards public library services and facilities, there is significant differences (2=270.1; P<0.001) are observed between the frequencies of responses. Hence, the null hypothesis is rejected and research hypothesis formulated "There is a significant difference between the frequencies of responses of YAPL users and public library services" is accepted.

Table 12: Attitude of YAPL Users towards Public Library Services and Facilities

Services and Facilities	Mean	SD
Library opening hours	3.94	1.19
Providing reference information	3.71	1.14
Information and notice regarding new books, magazines, and news papers	3.59	1.23
Availability of information for generating new ideas	3.39	1.18
College and career information	3.35	1.17
Timely document delivery	3.38	1.14
Programmes for Users training	2.95	1.33
Giving personal attention to users	2.97	1.33
Drug, alcohol and sex information	2.80	1.35
Ability to obtain materials from other libraries	2.99	1.36
Attractive library borrowing system	3.04	1.32
Availability of reading materials	3.42	1.28
Employment programs like, job skills workshops, mentoring etc. for young adults	3.15	1.30
Providing public awareness of young adult library services	3.21	1.29
Library rules and policies for young adults	3.47	1.16
Providing services to young adults	3.43	1.18
Arrangement and proper shelving of books	3.46	1.19
Encouraging the use of the collection in all formats	3.30	1.24
Co-operation with other professional and voluntary institution	3.14	1.22
Easy and convenient access to library collection	3.36	1.23
Chi- Square and P Value	2 = 270.1;	P < 0.001

Codes: SD = Standard deviation, 2 = Chi-Square, P = Probability, P?.050 - Significant,

P > .050 - Not Significant

CONCLUSION

The summary of the present study is that, of the total respondent's more number of YAPL users are in the age group of 21-25 year representing 35.4%, regarding gender majority scoring 77.6 % of respondents are male users. The result also reveals that a large number of respondents have Kannada as their mother tongue scoring 86.9 percent. About 44.8% of respondents are UG degree holders, nearly 36.5% of YAPL users are students. Whereas majority scoring 84.6% of respondents were unmarried. Nearly 53.6% of respondents belong to less than Rs.5, 000 income groups. Most of the respondents scoring 44.5% are from the city area. Regarding frequency of library visit about 51.7% of respondents visit the library daily

The study also reveals that the main purpose for which the YAPL users visit the library is 'To use newspapers/magazines and journals' with mean value of 4.04. Majority of YAPL users are interested in reading 'Historical fiction' with highest mean value of 3.63, regarding the collection the YAPL users were satisfied with the 'Reference books' with highest mean value of 3.87. It is clear from the table that general attitude of library staff towards readers is good with highest mean value of 3.86, majority of YAPL users are highly impressed with 'Library opening hours' with highest mean value of 3.94 and they are also impressed with adequate ventilation and lighting with the mean value of 3.77.

It can be concluded that, by considering the above parameters the present study reveals that the YAPL users have good attitudes

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and opinion towards public library services in Tamilnadu. *Paper presented at the National conference on "Re-inventing and restructuring of public library system in India*, Bangalore.

Karnataka. And this type of study very essential and it has to be conducted regularly to know the perception and attitude towards library services and facilities; it helps to improve the services and facilities of public library and thereby fulfill the information requirements of users.

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Contribution of Scholarly Research Output in Physics: A Study with Special Reference to the Banaras Hindu University

Jayendra Kumar Singh

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Research Scholar
Dept. of LIS,
BHU-Varanasi

Corresponding Author
Jayendra Kumar Singh
Singhjayendra02@gmail.com

ABSTRACT

The present study deals about the 2300 contributions made by the authors and scientists of Banaras Hindu University (BHU) especially in the field of physics. It examines the contribution of this university under the various heading including decade wise growth of Physics publication, contributions over different areas (subfields) of Physics, contributions by the authors of the Department of Physics, most prolific authors of the Department of Physics and most preferred journals in which top physicists prefer to publish their work. The research output of BHU especially in the field of Physics is found to an upward trend.

Key Terms: SAW, Cosmology Physics, Astrophysics, Radar, BHU, Polymers.

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INTRODUCTION

At the time of independence, the growth of Science and Technology was very small. But today, there are more than 300 Universities, 400 research and development organizations, and 13 institutes of national importance covering research in Engineering and Technology, Physics, Chemistry, Mathematics and other disciplines of Pure Sciences. So there is urgent need to know research output of a particular university/institution.

Banaras Hindu University was founded by the great nationalist leader, Pandit Madan Mohan Malviya, in 1916 with cooperation of great personalities like Dr Annie Besant, who viewed it as the University of India. This university was created under the Parliamentary legislation B.H.U. act 1915. It played a major role and has developed into the greatest center of learning in India. It has immensely contributed to the progress of the nation through a large number of renowned scholars, scientists and technologists who have graced its portals.

Banaras Hindu University ranks among the first few in the country in the field of academic and research output. Under various programs conducted by UGC, universities have developed laboratories and infrastructural facilities in the field of physics. The Department of Physics is making its mark at the national and international levels in a number of frontier areas of Science & Technology.

In the present study an attempt is made to look at the research output and contribution of Department of Physics of BHU by the authors and scientists of this department.

LITERATURE REVIEW

A number of studies have been done during the last three decade to evaluate the research output Barun, T et.al. (1994) Bhattacharya et.al. (1997) and Bonilla et.al. (2007) etc and productivity in the field of physics in terms of author productivity, literature growth & subject distributions and their citations.

In 2005 Dhawan et.al studied the physics research on the basis of journal impact factor and their citation count. A number of studies have been done by Gupta et.al. to evaluate the research output in the field of Physics in India. Dhawan (1988), Dhawan et.al. (2007), Gupta et.al. (2009).

In 1998 & 2009, Gupta, et.al. studied the literature growth and author productivity in Indian physics. A bibliometric study has been done by Nagpaul, P. S. (1995) to know about the contribution of Indian Universities in the science stream.

A similar study has been done by different authors to know about the physics periphery and its subfield Nagpaul et.al. (1994), Pyenson et.al. (1997) & Todorov (1995). Pichappan studied about the core journals of science stream in 1995.

OBJECTIVES AND SCOPE

The purpose of the study is to explore the research output in physics in order to measure the scientific development in Banaras Hindu University, Varanasi, and Uttar Pradesh. The following objectives are set for the present study:

- To find the decade wise growth of physics publication from the Banaras Hindu University, Varanasi.
- To analyze the areas in which contributions have been made.
- To find out the total contribution of Department of Physics by the authors and scientists of this department.

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- To identify the most productive Physicists of the department.
- To identify the most preferred journals in which Physicists prefer to publish their work.

METHODOLOGY

With the widespread advent of information technology, almost every faculty members are now maintaining their own web site and using email for formal/informal communication. In the last few years, universities in India also develop their websites and maintaining the profile of their faculty members. These resources can be used as a base to know the research involvement of scientists and their contributions also.

The data presented in this paper have been accessed from website of "Department of Physics" Banaras Hindu University, Varanasi. The basic data relating to total contributions (During the year 1970-2010) has been collected in the month of May-June 2010.All the bibliographic details about contribution of each author and scientist were noted on Micro Soft-Excel for analysis a computerized database is created for in-depth analysis.

Since the study is based on scholarly publication of scientists of BHU especially in the field of physics, survey method is the most suitable way to know the contribution of each author and scientist.

In order to understand the subject connotation of physical science personal interview with scientists and sending email been performed also.

DATA ANALYSIS AND RESULTS

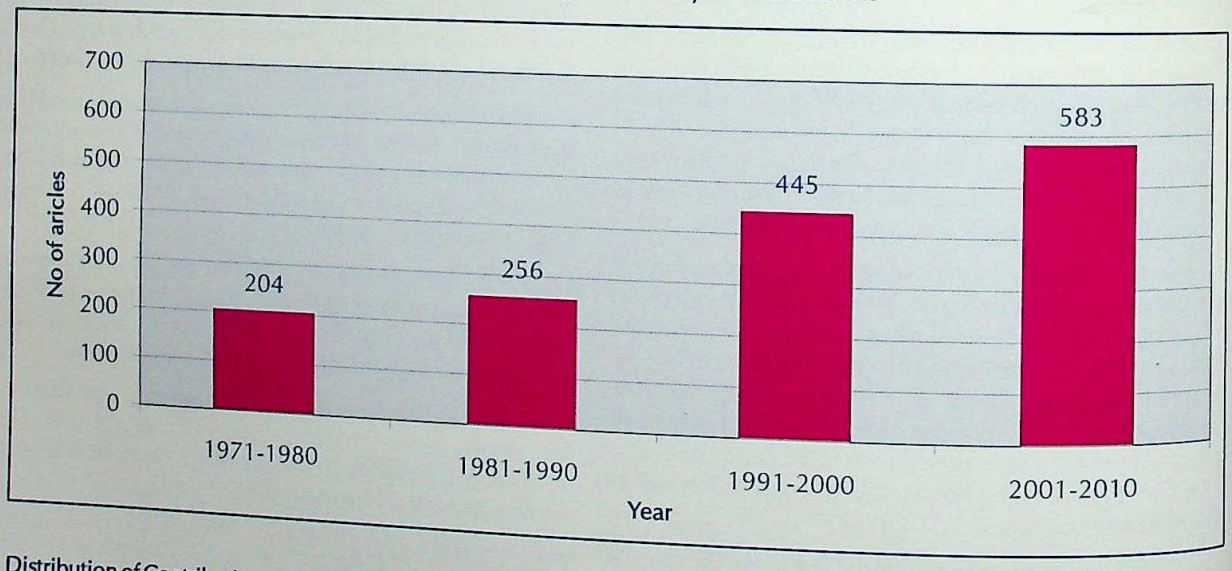
Decade wise growth of Physics Publications

Table 1 shows decade wise growth of Physics publication BHU. Although total publication of university is 2300 during year 1970-2010, only those publications are taken whose dec wise growth are available on website of physics department whose data are collected from personal interviews and throug mails. During the period 2001-2010 growth is highest. publication growth shows an increasing trend during the t span 1971-2010.

Table 1: Decade wise growth of Physics Publications

Decade	Articles (Growth)
1971-1980	204
1981-1990	256
1991-2000	445
2001-2010	583
Total	1488

Figure 1: Decade wise growth of Physics Publications



Distribution of Contributions in Subfield of Physics

Table 2 shows the major subfields of physics in which contributions have been made by the various authors and scientists of BHU. Out of 2300 contributions, 960 contributions are in the field of Condensed Matter Physics, 324 contributions are in High Energy Particles Physics, 571 are in Molecular Structure and Spectroscopy, 70 are in Solid state electronics and physics, 50 each is in Physics of Electronics Materials & Devices and Surface acoustic wave(SAW), 67 are in Theoretical Nuclear Physics, 55 are in Theoretical Physics, 73 are in Space Plasma Physics, 23 are in Material Science, 14 are in Positr Annihilation and 43 are in the field of Optoelectron Condensed Matter Physics (Theoretical and Experimental) is most preferred field in which maximum contribution (contributions) has been made. While minimum contributions been made in the area of Positron Annihilation (only contributions). Out of 2300 contributions more than 5 contributions has been made in these two subfield of physics i.e. Condensed Matter Physics and High Energy Particle Phys (55.82% contributions)

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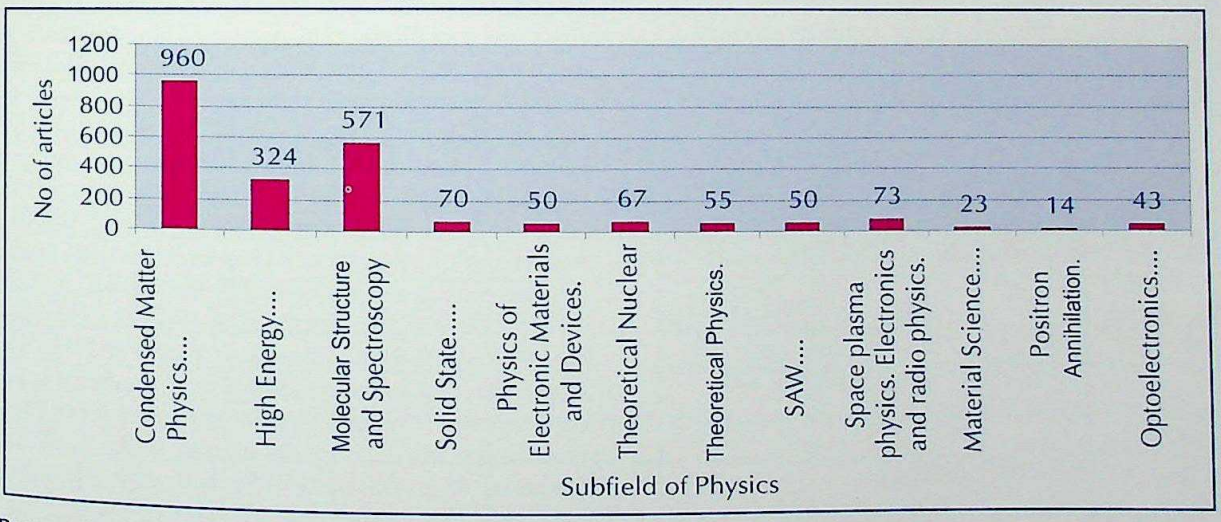
Table 2: Contributions in Different Subfields

S. No	Subfields	Contributions
1.	Condensed Matter Physics.	960
2.	High energy particle Physics Phenomology, Cosmology and Astrophysics	324
3.	Molecular Structure and Spectroscopy	571
4.	Solid state electronics and solid state physics	70
5.	Physics of Electronic Materials and Devices	50
6.	Theoretical Nuclear Physics	67
7.	Theoretical Physics	55
8.	Surface acoustic wave (SAW) devices and radar signal processing.	50
9.	Space plasma physics. Electronics and radio physics.	73
10.	Materials science (amorphous semiconductor, polymers).	23
11.	Positron Annihilation.	14
12.	Optoelectronics. Material sciences.	43
	Total	2300

Figure 2: Contributions in Different Subfields



Range-wise Contributions by Authors

Table 3 explains range wise contributions by the authors of this department. 28 authors have contributed between the range of 0-50, 4 authors between the ranges of 51-100, 3 authors have contribution in the range of 101-150 and only single author has contributed more than 200 contributions.

Authors	Research Output Range	Contributions
28	0-50	815
4	51-100	281
3	101-150	375
1	151-200	481
6	More than 200	348
45	Not Known	Not Known
		2300

Most Productive/ Prolific Authors

To prepare the rank list of authors, a list of authors has been prepared taking the total research outputs published by the each author/scientist. Author/Scientist name may be the first author, second author and at any position of author's name. The higher the number of research output, the higher will be the ranking. Table 4 provides the ranked list of top 10 authors with 1430 publications/research outputs and other/rest authors with 870 outputs only. O. N. Srivastava ranks first with 348 outputs (out of 2300) followed by P. C. Mishra with 169 output, S B. Rai with 161 outputs, C. P. Singh with 151 outputs, T. V. Ramakrishnan with 150 research outputs, Y. Singh with 115 outputs, V. Singh with 110 outputs and R. S. Tiwari with 84 outputs. Fig 3 & 4 presents the research outputs/contributions of top ten prolific authors of the department of physics, Banaras Hindu University.

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Table 4: Contributions of Top Ten Highly Prolific Authors/ Scientists

S. No.	Author / Scientist	Research Output	%age	Rank
1	Srivastava, O. N.	348	15.13	1
2	Mishra, P.C	169	7.34	2
3	Rai, S. B.	161	7.00	3
4	Singh, C. P.	151	6.56	4
5	Ramakrishnan, T. V.	150	6.52	5
6	Singh, Y	115	5.00	6
7	Singh, V.	110	4.78	7
8	Tiwari, R. S.	84	3.65	8
9	Shanker, R.	83	3.60	9
10	Asthana, B. P.	59	2.56	10
11	Rest 35 authors/scientists	870	37.82	
Total	45 Authors/ Scientists	2300	100	

Figure 3: Contributions of Top Ten Highly Prolific Authors/ Scientists

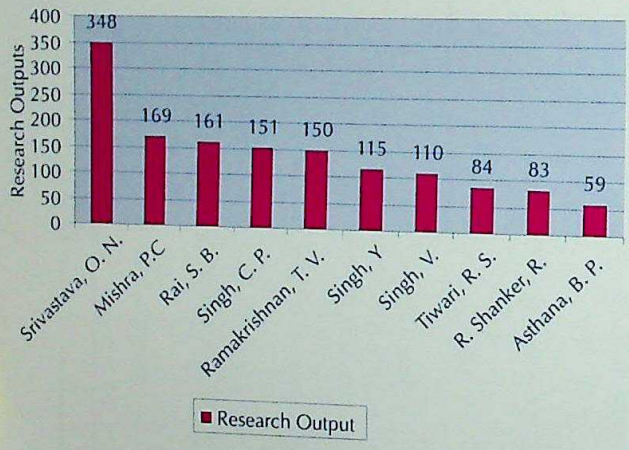
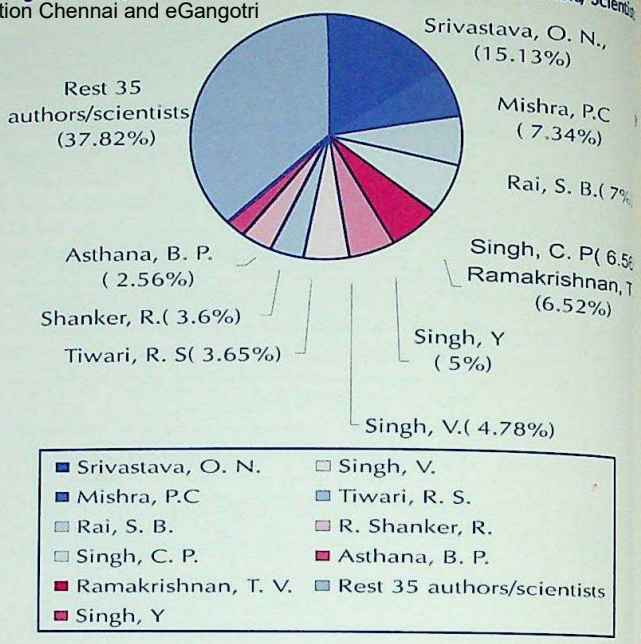


Figure 4: % age of Contributions of Top Ten Highly Prolific Authors/ Scientists



❑ Most Preferred Journals in which top Physicists prefer to publish their work.

The leading journals preferred by the topmost four authors of the department of physics are Spectro Chim Acta with 35 research output/papers, Int J of Hydrogen Energy and J Mol Struct with 3 research outputs/ papers each, Ind J of Pure & Appl Phys with 2 research outputs/papers, J Alloys & Compds with 22 research outputs/ papers, Int J Quant Chem with 21 research outputs papers, Pramana J Phys and Ind J of Phy with 18 research outputs/papers, Solid state Commun with17 research outputs papers and Phy Rev D with15 research outputs/papers. Table presents most preferred journal by the authors of the department of Physics. It also provides the rank of top 22 journals preferred by the authors/ scientists of the department of Physics. Spectro Chim Acta is the most preferred journal by the authors/ scientists of the department of Physics. In Indian journal, Ind. J of Pure and Appl Phys is the most preferred journal (3rd rank) followed by Pramana J. Phys and Ind. J. of Phy (both are in 6th rank).

Table 5: Most Preferred Journals

	Most Preferred Journals by the Top Authors (Study of 829 Research Outputs)				Total	Rank
Author's Name ⟶ / Journals Title ↓	Srivastava, O. N	Mishra, P.C	Rai, S. B	Singh, C. P		
Alloys and Compounds				1	1	22
Appl. Phy. B				3	3	20
Acta Cincia Indica				1	1	22
Appl. Spectrosc				1	1	22
Asian Chem. Lett				1	1	22
Asian J. Phys				3	3	20
Acta cryst.	11				11	12

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Bull of laser & Spectroscopy Society of India				1	1	22
Bull of Mat Sci	12				12	11
Cand. J. Phys			7		7	16
Condensed Matter & Materials	3				3	20
Crys Res Tech	13				13	10
Current Science	1	1	5	1	8	15
Chem. Phys. Lett		3	8		11	12
Chem. Rev			1		1	22
Crystal Growth and Charactersization of materials			1		1	22
Eur. Phys				7	7	16
Fullerene Sc.	2				2	21
Hydrogen Energy Processs	12				12	11
Ind. J. Biochem. Biophys.		11			11	12
Ind. J. Chem	2				2	21
Ind. J. Mat & Engg			1		1	22
Ind. J. of Phy	1	1	15	1	18	6
Ind. J of Pure & Appl Phys	3	21	4	1	29	3
Int. J of Hydogen Energy	31				31	2
Int.J. Quant. Chem		21			21	5
J . Alloys & Compds	21		1		22	4
J .Appl Crystall	6				6	17
J.Applied Physics	1		2		3	20
J. Crystal Growth	6				6	17
J.Comput.Chem		6			6	17
J.de Chim. Phys			2		2	21
J. Mol. Spectr			4		4	19
J. Mat. Sci	2				2	21
J.Mol.Model		3			3	20
J. Mol .Struct		30	1		31	2
J. Nanoscience & Nanotechnoloogy	7				7	16
J. Non-Crystalline solids	3				3	20
J. Phys. A				1	1	22
J.Phys B			5		5	18
J. Phys. G				2	2	21
J. Phys . Chem A		2			2	21
J.Phys. Chem B		3			3	20
J. Phy: condensed Matter	6				6	17
J Phys. D	9				9	14

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J. Sci. Res			2		2	21
J.Thin solid Film	10				10	13
Japanese J. Appl Phys	5				5	18
J.Phys.Soc.Japan				2	2	21
Laser Spectroscopy			1		1	22
Material Research Bulletin			1		1	22
Mat Sc & Engg	9				9	14
Mol.Phys		3	1		4	19
Nucl. Phys. A.				4	4	19
Nucl. Phys.B				1	1	22
Nuovo Cim			1	7	8	15
Optics Commmunication			2		2	21
Phys.Education				6	6	17
Phys. Lett B				14	14	9
Phys. News				3	3	20
Phil. Mag	11				11	12
Phy.Rev B	7				7	16
Phys. Rev. C				6	6	17
Phy. Rev. D				15	15	8
Phys. Rev. Lett				5	5	18
Phy. Stat Soc	14				14	9
Physica C	11		3		14	9
Physica Scripta			3		3	20
Pramana J Phys	1	4	11	2	18	6
Prog Theor. Phys				4	4	19
Progress in Hydrogen Energy	2				2	21
Quantum Chemistry Program Exchange Bulletin		3			3	20
Science Lett			1		1	22
Semiconductoer Sciences & Technology	2				2	21
Solid State Commun	10		7		17	7
Spectro Chim. Acta		10	25		35	1
Supercond. Sci & Technol	7				7	16
Zeit Krist	5				5	18
Zeitf: Phys				3	3	20
Z fur Physik, Atom and Nuclei			1		1	22
Other journals/proceedings /seminars etc	102	47	34	66	249	
Total	348	169	161	151	829	

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CONCLUSION

The Department of Physics has produced 2300 contributions/ research outputs by the various authors and scientists of this department during the time period of 1970-2010. During the period 2001-2010 growth is highest. There may be the several reasons including online facility provided by the publishers. It may be possible due to collaborative research. More than 80% of contributions have been made in the area of Condensed Matter Physics, Molecular Structure & Spectroscopy and High Energy Particle Physics. Total contributions have been made by the 45 authors of this department in which contributions by the 6 authors have been not indexed (at the time of study) in the website of BHU. The most productive authors study shows that research outputs (published papers) is one of the most important factor to identify the physical scientists. In the list of most productive authors O. N. Srivastava has 1st rank followed by P. C. Mishra with 2nd rank and S. B. Rai 3rd rank. Out of 45 authors only top seven authors have contributed 52.33% (more than 50%) contributions. It is clear from the present study that physical scientists are very selective in publishing their research outputs in highly reputed and very specialized journals. Special attention should be given to the universities for improving their quality & quantity of research outputs. This can be done by allocating the funds in weak areas as well as in highly specialized areas, improving teaching methods, faculty development in newer fields, enhancing opportunities for international collaborations in research work and by attracting new young blood with good academic records for teaching and research in universities.

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Research Output of Indian Universities: Observations and Key Issues

Preeti Mahajan* and Suresh K Chauhan**

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*Professor
Dept. of LIS
Panjab University, Chandigarh
**Librarian
Jaipuria Institute of Management
Noida

Corresponding Author
Prof. Preeti Mahajan
ipreeti2001@yahoo.com

ABSTRACT

Universities are known as generators of knowledge, hence, thesis produced by these universities are of much importance at national or international level. India has one of the biggest higher educational systems in the world but unable to attract most of its young population in higher education stream. Lack or resources, less number of universities, social and gender issues are some of the important impediments, Indian government needs to address upon. In this chapter an attempt is being made to know trends of research in Indian universities with respect to production of number of PhDs. The analysis will also help to know trends, characteristics as well as the gray areas of research productivity where government can focus to streamline the mechanism.

Key Terms: Research output - India; ETDs - India; Higher Education - India, INFLIBNET, Vidyanidhi, DELNET.

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INTRODUCTION

Higher education in India has been expanded well in terms of institutions, teachers and enrolment of students after Independence. There were 20 universities and 500 colleges at the time of independence and Gross Enrolment Ratio (GER) was nearly less than 1.0 per cent in 1950s. GER is a parameter derived by United Nations in which students enrolled in particular streams (school, college and university) can statistically measured. Now, India has more than 523 Universities and around 33,023 colleges accommodating about 17 million students enrolled to higher education system that states 12.0 per cent GER, which make India's higher education system as the third largest in the world after China and United States. In higher education the metrics of GER measures the total population in the age group of 18-24 against population of all ages enrolled. It shows that merely 12 per cent of total enrolled population is enrolling in higher education, which presents a sadistic overview about the situation. This number tells that Indian universities cater a small proportion of those eligible to go for higher education, Paul & Samuel (2012). Many reasons, such as poverty and gender social problem, can be pointed out but less number of institutions is one of the major constraints in the growth of GER. Indian higher education GER is still very low as compared to 23.2 per cent of the world average, i.e. 54.6% for developed countries and 36.3 per cent for countries in transition. Further, there is a big gap between India's GER and individual developed countries, e.g., the GER of students in higher education in Canada is 88 per cent; USA 80.9 per cent; Australia 79.8 per cent, UK 52 per cent; and France 50 per cent. Even the position of a developing country like Thailand is better than India where GER in higher education is about 19 p cent Singh & Ahmad (2011). Apparently growth in GER wou boost the research output of country and for improving researc outcome, therefore, there is a need to open various ne universities to accommodate a huge portion of Indian populatio

Realizing the fact, under XI Plan (Five Year Plan of Government India, i.e. 2007-12) a target was set up to increase the GER higher education from about 10 per cent in 2007 to 15 per cent 2012, 21 per cent by XII Plan and 30 per cent by the year 20 (Government of India). To achieve the target of 5 per cent increa in GER, the Government of India has significantly increased t allocation of budget to higher education from Rs.3, 294 cro during the X Five Year Plan (i.e. 2002-07) to Rs.46, 449 crores the XI Five Year Plan.

The Government has also opened various new universities a institutions to accommodate more number of students Pradh (2011). However, the universities are not just aiming to imp higher education at different levels but also making a significa contribution to the growth of knowledge. Kurup & Arora (2010) a report on trends in higher education in India stated that creati of new knowledge depends largely on a robust educati sector, particularly higher education and research output the country. Hence, realizing the potential of higher educatio several countries have made huge investments in this sect Khandaria (2004) reported that number of doctorate degre awarded raised an increase of 30.6 per cent between 1991-92 1998-99. Paul, G. & Roberta, C. (2003) studied that the completed in Australian universities are an important compone

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of the nation's research output. It is estimated that nearly 8000-10000 Ph.D. thesis are produced every year by all the universities put together in India Vijayakumar et.al. (2003). Cyranoski et.al. (2011) has reported that India produces around 14000 PhDs in a year. UGC Annual Report (UGC, 2010-11) states that research degrees of Ph.D. awarded during 2009-10 was 11,161. Out of this, Faculty of Arts hold 3490 degrees, Faculty of Science awarded 3,742 PhD degrees. The report also revealed a decreasing trend in academic research in terms of number of research degrees awarded by the university during 2009-10 against 13,768 research degrees in 2008-09. This is still a fraction of the number of doctorates from other countries like US (over 70,000), China (49,698), Japan (16,296), United Kingdom (16,606) and Germany (25,604), etc. Chiswick et.al. (2010) also stated in their working paper that high-skilled workers are essential inputs in the economic growth of the country and most highly skilled workers typically complete their formal schooling with a PhD degree.

To improve the quality and quantity of doctoral degrees, the Government of India has started giving a large amount of funds to universities for research activities and adopted various measures to assess the worth of research output. Whole process enforced universities to produce relevant and quality PhDs, Balaram (2011). The Government of India, for strengthening Indian Higher Education System, has establishing state-of the art infrastructure in the university campuses through UGC-Info net infrastructural programme. Through this programme the Government is facilitating Indian universities with latest information and communication technology (ICT) equipments. These ICT equipped campuses are given online access to various scholarly literature from around the world through programmes such as UGC-Infonet Digital Library consortium and N-List etc.

STATEMENT OF THE PROBLEM

Thesis is a valuable source of knowledge which achieved through sincere efforts from a researcher, supervisor and whole system associated with it. Such a good time and money are being incorporated in it. Hence, duplication of such efforts needs to be avoided from the very first level. In India there is no source which provides a complete listing or record of awarded thesis. However, at individual level university library has been keeping a physical or electronic copy of awarded thesis for the use of bonafied students only and rarely being shared with other universities. The bibliographic control over thesis may also help policy makers to find out grey areas where some measures can be adopted well in time.

BIBLIOGRAPHIC CONTROL

There is a need of exhaustive bibliometric control as well as analysis to know about the production of PhD thesis by Indian universities. As of now, after 66 years of independence, the Government of India still lacks to find out mechanism to record authentic or factual information about the number of PhDs being awarded in the Indian universities. There is no specialized body to keep record of the doctoral thesis published by Indian universities as well. However, some efforts have been made to have a bibliographical control over production of PhDs by universities at individual level and by few of the organizations, libraries and information centers. Some of these are:

❑ INFLIBNET

The INFLIBNET is developing a Union database of Thesis that covers the bibliographic Metadata of Doctoral Thesis submitted to more than 275 Universities/Institutes in India. It has over 2, 48,774 unique records from all subject areas. The information is contributed by the participating Universities and is also collected from various reliable sources including university announcements, etc. The database is not updated, since there are a number of universities who are not sending the required information as they are not participating in this venture because it is not mandatory for them to participate in it. However, recently University Grants Commission (UGC) has entrusted INFLIBNET to maintain a repository of Indian full text thesis (Sodhganga).

❑ VIDYANIDHI

Vidyanidhi is India's premier Digital library initiative to facilitate the creation, archiving and accessing of doctoral thesis. It enhances access to Indian thesis and enlarges the reach and audience for Indian doctoral research works. Through Vidyanidhi one can access metadata of over 1, 00,000 Indian Thesis and also access or view or download over 5000 full text thesis under author's instructions.

❑ DELNET

DELNET is engaged in providing various databases to Indian academicians including Union Database of Thesis and Dissertations where one can access the metadata of over 48,000 Indian thesis and dissertations.

❑ ASSOCIATION OF INDIAN UNIVERSITIES

AIU through its weekly magazine called 'University News' is publishing a list of doctoral thesis which has been accepted by Indian universities. Although the data received and published by AIU is authentic yet it is not upto date as many of the universities are not regular in sending their thesis acceptance notification to AIU.

❑ OTHER AGENCIES

Department of Science and Technology (DST), National Social Science Documentation Centre (NASSDOC), Indian Council of Medical Research (ICMR) and Indian Council of Agricultural Research (ICAR) are also keeping record of PhD thesis in their respective areas. However, inspite of such efforts, no Indian agency or centre has authentic detail about the awarded PhDs as well as ongoing PhDs.

OBJECTIVES AND METHODOLOGY

Association of Indian Universities (AIU) collects notifications of PhDs acceptance from all member universities and publishes the same in a weekly magazine entitled 'University News'. In the present study, all PhD notifications published in the 'University News' during last five years were compiled and analyzed with the following objectives:

- Subject-wise trend and comparison on production of PhDs
- State-wise trend and comparison on production of PhDs
- Average per university and university-wise trend and comparison on production of PhDs

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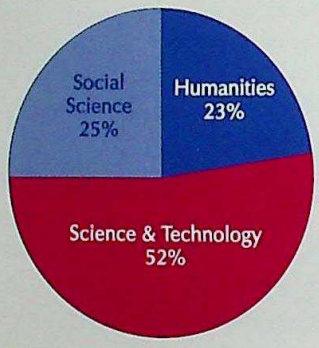
ANALYSIS AND OBSERVATIONS

As per the AIU list of PhD notifications, a total of 36296 PhDs were awarded during 2007-12 accommodating 212 universities.

❑ Subject-Wise Trend & Comparison on Production of PhDs

AIU has divided all listed PhDs in three major subject areas, i.e. Humanities, Science & Technology and Social Sciences. It has been found that research in Science & Technology is prominent, whereas research in areas of social sciences and Humanities are being slightly ignored. Chart-I represents the output of Indian universities in terms of PhDs produced in these three basic subjects. The chart simply reflects that more than half (52%) of the doctorate research work in Indian universities is being done in the areas of science and technology. Collectively Social Sciences and Humanities subjects are holding 48% of the total PhD production.

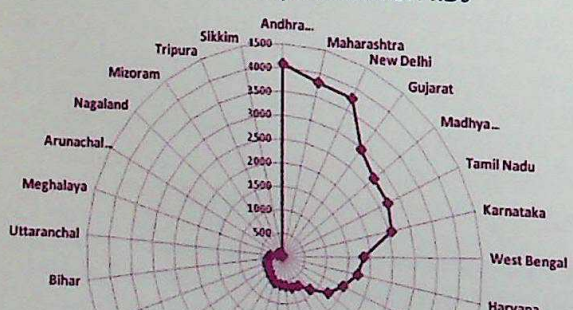
Chart1: Most productive subject areas for PhDs



❑ State-Wise Production of PhDs

The Chart 2 shows state-wise production of PhDs in India. Andhra Pradesh is the top state which awarded 11.2%, of the total PhDs of the country. Maharashtra is at second position by producing 10.7% of overall production. New Delhi (including Indian Institute of Technology), comes at third position which captures 10.3% of total PhD production of the country.

Chart2: State-wise production of PhDs



❑ University-wise Status

Chart -3 provides information about top 10 universities which are actively engaged in the doctoral research in the country. Osmania University accommodating 5.48 per cent of the total PhD awarded during the sampling years. The 61.09 per cent PhDs awarded by this university is in areas of Science and Technology. Humanities related subject areas accommodate (16.83 per cent and 22.06 per cent has awarded in social sciences. Another University is the second by covering 5.41 per cent of the total PhDs of the country. 98.64 per cent of the total production of this university is only in Science & Technology subject areas. Moreover this university is producing 10.33 per cent share of total Science &Technology PhDs of the country. This university is followed by Dr. Babasaheb Ambedkar Marathwada University, Maharashtra with 4.50 per cent, Jawaharlal Nehru University 3.95 per cent and University of Calcutta 3.29 per cent at third, fourth and fifth place respectively.

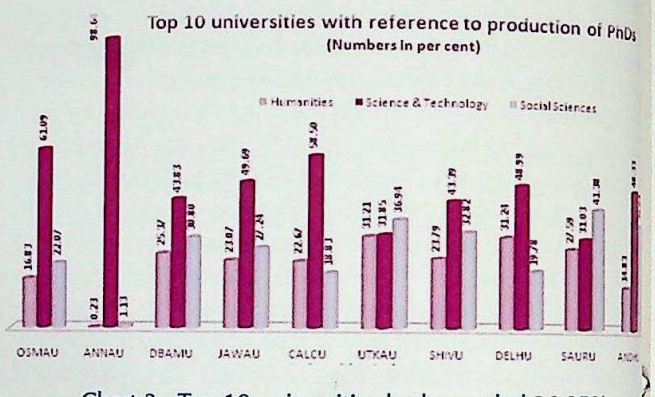
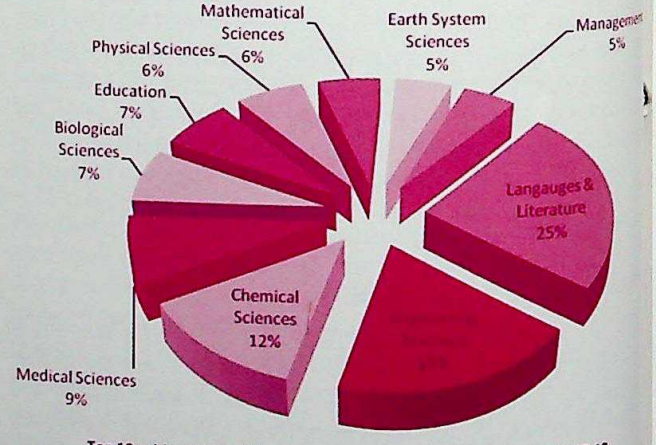


Chart 3: Top 10 universities had awarded 36.25% of the total PhDs of the country.

❑ Subject-wise Trend and Production of PhDs

As depicted by the Chart-4, Language and literature (including linguistics) is the most productive subject area, which accommodates 25% of the total number of PhDs, produced in the country. It is being followed by Engineering and Technology with 18%t and 16% by Biological and Medical Sciences which broadly categorized as life sciences. However, dominance of Chemical sciences is 12% in PhDs production.



Top 10 subject areas with reference to production of PhDs during 2007-12

Research in management and business related areas is also not behind which holds the fifth position with 5 per cent part of the whole research. Number of research in other areas like, Tourism, Agricultural and Veterinary Sciences, Social Work, Geography and newly emerged such as Nano - technology etc. need to be improved.

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SUGGESTIONS & DISCUSSION

From the analysis, it has been observed that most of the research is being carried out in Science and Technology areas only, Government needs to adopt the facility and possibility to enhance the number of research as well as job options for the students or scholars who are engaged in humanity and social science areas.

Quality of research is again an important issue to tackle by the Government. Kuruvilla (2010) revealed that nearly 10, 000 candidates secure PhD annually from the Indian Universities, but the quality of PhD dissertations shows a declining trend. Repetition of research works with light changes in a particular concept or variable cannot be counted as of any value to the knowledge reservoir or to social welfare. He further pointed out that several of the PhD thesis generated in our universities serve the purpose of decorating the racks of university libraries. There are instances where nobody would come to know about the new addition in the library. Hours of work done by a researcher, the cost paid by the universities and the UGC, if find no user to the society will be a national waste. Siwach & Siwach (2010) critically evaluated the quality of research. They opinioned, that the quality of research product and process in Indian universities is a matter of grave concern. They revealed that in Indian universities the instances of plagiarism goes to extent of utter shame wherein a same PhD thesis was copied by eight scholars. Therefore, Government needs to come out with a solution to restrict plagiarism to the maximum extent.

India is known as one of the largest higher education systems in the world but it is quite strange to know that it has no mechanism to figure out total number of PhDs being awarded in the country. Even though, various institutes and government agencies trying to record total number of PhD being awarded but no systematic provision has been made yet.

Being a vital source of information, PhD Thesis is being submitted by scholars in print as well as in electronic format. The electronic copy of the thesis or dissertations (ETDs) can upload in the university thesis database which could be accessible by the registered students or openly available to all. INFLIBNET centre with direction of UGC has been accumulating bibliographical records of all published thesis. Recently under UGC's mandate, INFLIBNET is working upon creating a Union Bibliographical Database of thesis and also managing ETDs for the use of academics.

As per UGC's notification (Submission of Metadata and Full-text of Doctoral Thesis in Electronic Format) Regulations, 2005 'All universities should set-up an e-thesis repository to facilitate e-submission, archiving, maintenance and access to these repository; at the University and also at a national repository at a website designated by the UGC; and Universities may use OAI-complaint open source software to set-up their e-thesis archives (e.g. D Space, ETD Software of VT, E-prints, etc.)'. Generally copyright protect the authenticity and ownership of written document belongs to author. But a thesis is a research output of a collaborative efforts guide and researcher, both. The copyright should remain with the University and a university comes under the purview of UGC or Government which again belongs to people of the nation. Therefore, it would be advisable that all thesis should be kept open or available open over the Internet through Union National Database.

CONCLUSION

As of now, India is able to attract or facilitate only 12 per cent of the total population which could be a part of higher education. India needs more number of universities (roughly 1500 more), equipped with quality resources, to accommodate vast number of its population in the main stream of higher education. Policy makers also need to adopt some measure to bring down the social, gender and geographic gaps so that maximum number of students may able to enroll in higher education. A proper mechanism is also required to enhance the quality of research output. The union database of Indian thesis, being developed by INFLIBNET, should be supported by UGC and all the universities so that a bibliographic control over thesis can be established.

University Code

OSMASU-Osmania University; ANNAU-Anna University; DBAMU-Dr. Babasaheb Ambedkar Marthwada University, JAWAU-Jawaharlal Nehru University CALCU-University of Calcutta; UTAKU-Utakal University; Shivu-Shivaji University, Delhi-University of Delhi; SAURU-Sauru-Saurashtra University; ANDHU- Andhra University

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Computer Literacy and Use of Web Resources: A Survey on Medical Faculty and Students

Mahabaleshwara Rao Baikady* and Mahesh V. Mudhol**

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*Assistant Prof. & Senior Librarian
Dept. of LIS & Health Sciences Library
Manipal University, Karnataka

** Associate Professor
Dept. of LIS
Mangalore University, Karnataka

Corresponding Author
Mahabaleshwara Rao Baikady
baikadi@yahoo.com

ABSTRACT

This study was conducted to determine the level of computer literacy skills in the use of web resources amongst medical faculty and students. A self-administered structured questionnaire was used. This study showed that the web was competing fiercely with libraries. The convenience of the web and easiness of obtaining information on the web will attract more and more medical faculty and students. This raises an urgent need for medical faculty and students to develop computer literacy skills and apply them in electronic information environment. Hence, it is recommended the medical college libraries in Coastal Karnataka to move aggressively to develop plans for users' computer literacy training.

Key Terms: Coastal Karnataka, Medical colleges, Medical libraries, Web resources, Computer literacy.

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INTRODUCTION

There have been tremendous advances in the computing and information technology leading to development of computer networks that allow access to vast amount of information and services. It is essential for the medical faculty and students to be computer literate. The Association of American Medical Colleges' (AAMC) states that "to practice medicine in the twenty first century, medical students must be given a strong grounding in the use of computer technology to manage information, support patient care decisions, select treatments, and develop their abilities as lifelong learners". Internet is one of the most important sources of information. The Internet is being used for medical education in diverse ways including teaching, diagnosis, and conduct of medical examinations. It is an important source of information for medical research. The information available on the Internet can overwhelm the students who lack the skills for verifying the quality of information available on-line, Arora (2005).

LITERATURE REVIEW

In order to utilize the growing range of web resources, faculty and students must acquire and practice the skills necessary to exploit them. "For students using a variety of online databases, it is as though they were parking lot attendants, where every vehicle is not only a different make and model but has a different configuration", Blandy (1995). As Dutton suggests, the skills required to maximize the potential of electronic resources are much greater than those required for searching printed sources. These skills include a knowledge of the structure of the database and the instructions which must be input into the computer by the searcher, as well as an understanding of the ways in which the instructions are linked with one another, Dutton (1990).

The ability to find and retrieve information effectively is a transferable skill useful for future life as well as enabling the positive and successful use of the electronic resources whilst at university. As Brophy argues, libraries must "reach a position where the acquisition of information skills is acknowledged as one of the key learning objectives for every student entering a university, so that no student leaves without being fully equipped to cope with the information intensive world - the information society as an end-user", Brophy (1993).

A survey conducted by Kalle & Matti on the use of electronic scientific information resources among medical and dental students showed that Information-searching skills are correlated with the use of electronic resources, but the level of basic PC skills plays not a major role in using these resources. The student data shows that adequate training in information-searching skills will increase the use of electronic information resources, Kalle et.al. (2006).

To help users develop effective search strategies, Nims & Rich investigated what mistakes users made while they were searching the World Wide Web. By using a recording software system at a university library, they were able to record and analyze users' mistakes. They found that users made usual mistakes while searching the web as they did with other databases; for example, poor search strategies and typing errors. "The problems poor

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searches strategies create are magnified when they are conducted on the web", Nims et.al. (1998).

Wang & Artero find the lack of search strategies added to students' difficulties in finding the information they needed. To increase the effectiveness of information search, students need to utilize various search strategies. Subject directory is an effective way to narrow down the search. Some search engines contain advanced features and allow for more narrowed-down search. Well-known academic websites contain quality information and links leading to other websites. Students can collect a number of such authoritative websites and use them as the central websites to branch out their searches. Many undergraduates consider that it is unnecessary to ask for assistance from the librarians since it is so easy to access and retrieve information from the web, Wang et.al. (2005).

Wang & Artero investigated universities and colleges need to move aggressively to develop plans for student information literacy training. Information literacy skills are essential to student academic success. Students need to receive information literacy training as soon as they enter the university. The university needs to develop benchmark for students' information literacy competency and evaluate their students based on the benchmark, Wang et.al. (2005).

Wang & Artero further write that information literacy training has been considered the sole domain of librarians. Nevertheless, a multi-disciplinary approach is the most effective way to address student information literacy development. Faculty need to play an active role in this process. It requires joint efforts from librarians and faculty to integrate information literacy across the curriculum. Faculty should make efforts to update their own information literacy skills and be prepared to guide students in using the web for research. Librarians and faculty can form a partnership to situate the teaching of information literacy skills to the context of courses, for example, a writing class or a research course. While students are assigned to write a research paper, librarian can come and teach how to search for information, evaluate information and cite information on the web relevant to student research projects, Wang et.al. (2005).

Maness in his article concluded that the library's services will change, focusing more on the facilitation of information transfer and information literacy rather than providing controlled access to it. Library and information professionals need the awareness on web resources and information technology. Without using the web resources he/she will not be able to cope up with these trends. There is a need to use the web resources to enrich the knowledge on present trends, Maness (2006).

Nims and Rich used the Search Voyager feature of Magellan, an online guide to the web, to examine student search techniques and found that problems caused by poor search strategies were magnified when they are conducted on the web. The same situation may happen to the library and information professionals also. In this scenario, the library and information professionals must have the ability to use and manage the web resources, Nims et.al. (1998).

Information literacy enables a college student to recognize information needed, develop a strategy to locate, evaluate and synthesize information, and cite sources of information accurately. Individuals are faced with diverse and abund information choices in their studies, in the workplace and in t lives. A variety of information is available through commu resources, special interest organizations, manufacturers a service providers, media, libraries and the Internet. Howe information has increasingly come unfiltered. This ra questions about authenticity, validity and reliability. In addit online information is available through multiple media, includ graphical, aural and textual. These pose special challenges evaluating, understanding and using information in an eth and legal manner. The uncertain quality and expanding quan of information also pose large challenges for society. Sh abundance of information and technology will not in itself cre more informed citizens without a complementary understandi and capacity to use information effectively, Bruce (1997).

METHODOLOGY

The aim of this study is to know the level of computer literacy medical faculty and students in using the web resources. T specific objective of the study is to "assess medical facu members and postgraduate students' use of web resources ver their level of computer literacy". Keeping in view the enormity the task, the authors intends to limit the scope of this study cover following six medical colleges of Coastal Karnataka.

- Kasturba Medical College, Manipal
- Kasturba Medical College, Mangalore
- Father Muller Medical College, Kankanady, Mangalo
- K S Hegde Medical Academy, Derlakatte, Mangalore
- Yenepoya Medical College, Deralakatte, Mangalore
- A J Institute of Medical Sciences, Kuntikana, Mangalo

The target population of this study constituted faculty membe and postgraduate students in the medical colleges of Coas Karnataka. The main instrument for data collection was a se administered questionnaire. The total study population w 2765 which include 1461 faculty members and 13 postgraduate students. A sample of 696 faculty members a postgraduate students of six medical colleges in Coas Karnataka was selected for the survey. The total sample size w 25.17%. Six hundred and ninety six questionnaires we administered, 472 filled in usable questionnaires (facu members-226 and postgraduate students-246) were return making a response rate of 67.82%.

DISCUSSION

Web Resources Available in Medical College Libraries

The study observed that medical college libraries under the stu are providing various types of web resources to their facu members and students. These have been provided in table 1.

Computer Literacy of the Medical Faculty and Students

Effective use of web resources for retrieving needed informa would be cumbersome without proper computing skills. Hen the respondents were asked to indicate their level of compu literacy in the use of web resources in this study. T respondents' ability is presented in table 2 & figure 1. From analysis, it is evident that almost all the respondents possess

Table 1:

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Table 1: Web resources available in medical college libraries

Web resources provided in the medical college libraries of Coastal Karnataka	
Bibliographic database	PubMed/MEDLINE
Full text online databases	Science Direct (SD)
	OvidSP (OSP)
	MD Consult (MDC)
	ProQuest Medical Library (PML)
	Cochrane Library Online (CLO)
Open access resources/databases	BioMed Central
	MedIND
	Free Medical Journals
	PubMed Central
	Medknow journals, etc.
Online journals of various publishers	American Academy of Pediatrics (AAP)
	BMJ.com
	JAMA and Archives (American Medical Association)
	Karger Online
	Oxford University Press (OUP)
	Sage Publications
	Springer Link
	Taylor and Francis
	Thieme Online
	Wiley-Blackwell, etc.
e-Books	e- Books (Elsevier Science, Freebooks4doctors, Lippincott, MD Consult, Student Consult, etc.)

some basic computer literacy skills. Findings further revealed that majority of respondents (51.1%) had average computer literacy while one third of respondents (33.9%) opined to have above average computer literacy. Very negligible number of respondents (4.7%) stated that they are having below average computer literacy.

Table 2: Level of computer literacy

Computer and literacy information	Faculty (n=226)	PG students (n=246)	Total (n=472)
Expert	20 (8.8)	9 (3.7)	29 (6.1)
Above average	64 (28.3)	96 (39.0)	160 (33.9)
Average	120 (53.1)	121 (49.2)	241 (51.1)
Below average	17 (7.5)	5 (2.0)	22 (4.7)
Beginner	5 (2.2)	15 (6.1)	20 (4.2)

Computer literacy of the respondents according to respondents' positions shows 53.1% of faculty members and 49.2% of postgraduate students were having average skills in use of web resources whereas 28.3% of faculty members and 39% of postgraduate students were having above average computer literacy. It is seen that only 7.5% of faculty members and 2% of postgraduate students were having below average computer literacy.

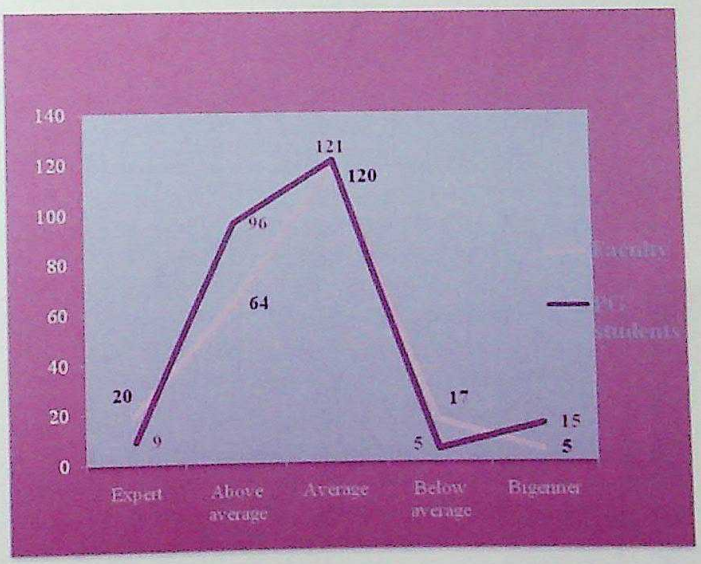

Fig. 1: Level of computer literacy

❑ Computer Literacy of the Medical Faculty and Students vs Use of Web Resources

One of the central concerns of this study was to assess faculty members and postgraduate students' use of web resources versus their level of computer literacy. Kumar et.al. (2008). pointed out in their study that ability to use digital resources efficiently depends on basic computer skills, knowledge of what is available and how to use it. Computer literacy was considered prerequisite or a determinant of the medical faculty and students' extent of the usage of web as a learning resource. Lack of basic computing skills could negatively impact on the usage of the web by faculty and students. A summary of this result is presented in the table 3.

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Table 3: Computer Literacy of the Medical Faculty and Students vs Use of Web Resources (1: daily, 2: at least 2-3 times a week, 3: 2-4 times a month, 4: rarely, 5: never, 6: not accessible)

Web resources		Expert (n=29)						Above average (n=160)						Average (n=241)						Below average (n=22)						Beginner (n=20)						p-value
		1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	
Biblio graphic database	PubMed/ MEDLINE	8 (27.6)	14 (48.3)	6 (20.7)	-	1 (3.4)	-	21 (13.1)	74 (46.3)	41 (25.6)	20 (12.5)	4 (2.5)	-	26 (10.8)	102 (42.3)	67 (27.8)	30 (12.4)	11 (4.6)	5 (2.1)	-	9 (40.9)	6 (27.3)	5 (22.7)	2 (9.1)	-	-	2 (10.0)	13 (65.0)	1 (5.0)	3 (15.0)	1 (5.0)	.000*
Online data-bases	Science Direct (SD)	6 (20.7)	10 (34.5)	6 (20.7)	1 (3.4)	5 (17.2)	1 (3.4)	10 (6.3)	49 (30.6)	40 (25.0)	34 (21.3)	19 (11.9)	8 (5.0)	8 (3.3)	51 (21.2)	56 (23.2)	50 (20.7)	56 (23.2)	20 (8.3)	-	4 (18.2)	5 (22.7)	4 (18.2)	3 (13.6)	6 (27.3)	-	2 (10.0)	8 (40.0)	1 (5.0)	7 (35.0)	2 (10.0)	.000*
	OvidSP (OSP)	4 (13.8)	6 (20.7)	6 (20.7)	3 (10.3)	9 (31.0)	1 (3.4)	3 (1.9)	27 (16.9)	37 (23.1)	36 (22.5)	44 (22.5)	13 (8.1)	5 (2.1)	35 (14.5)	46 (19.1)	51 (21.2)	78 (32.4)	26 (10.8)	-	4 (18.2)	5 (22.7)	4 (18.2)	3 (13.6)	6 (27.3)	-	-	5 (25.0)	2 (10.0)	11 (55.0)	2 (10.0)	.023*
	MD Consult (MDC)	3 (10.3)	10 (34.5)	5 (17.2)	5 (17.2)	5 (17.2)	1 (3.4)	4 (2.5)	44 (27.5)	34 (21.3)	30 (18.8)	39 (24.4)	9 (5.6)	10 (4.1)	48 (19.9)	37 (15.4)	44 (18.3)	75 (31.1)	27 (11.2)	-	5 (22.7)	2 (9.1)	4 (18.2)	5 (22.7)	6 (27.3)	-	-	5 (25.0)	-	13 (65.0)	2 (10.0)	.000*
	ProQuest Medical Library (PML)	2 (6.9)	3 (10.3)	8 (27.6)	9 (31.0)	4 (13.8)	3 (10.3)	6 (3.8)	23 (14.4)	31 (19.4)	27 (16.9)	56 (35.0)	17 (10.6)	5 (2.1)	27 (11.2)	29 (12.0)	32 (13.3)	98 (40.7)	50 (20.7)	-	1 (4.5)	-	5 (22.7)	7 (31.8)	9 (40.9)	-	1 (5.0)	2 (10.0)	2 (10.0)	13 (65.0)	2 (10.0)	.000*
	Cochrane Library Online (CLO)	1 (3.4)	2 (6.9)	8 (27.6)	10 (34.5)	6 (20.7)	2 (6.9)	5 (3.1)	16 (10.0)	40 (25.0)	40 (25.0)	48 (30.0)	11 (6.9)	3 (1.2)	14 (5.8)	46 (19.1)	61 (25.3)	80 (33.2)	37 (15.4)	-	-	2 (9.1)	6 (27.3)	8 (36.4)	6 (27.3)	-	-	4 (20.0)	4 (20.0)	10 (50.0)	2 (10.0)	.06
Open access resources /data bases	BioMed Central, MedIND, Free Medical Journals, PubMed Centra Medknow journals, etc.	5 (17.2)	10 (34.5)	9 (31.0)	2 (6.9)	2 (6.9)	1 (3.4)	8 (5.0)	47 (29.4)	36 (22.5)	45 (28.1)	20 (12.5)	4 (2.5)	8 (3.3)	50 (20.7)	54 (22.4)	52 (21.6)	52 (21.6)	25 (10.4)	-	2 (9.1)	6 (27.3)	4 (18.2)	4 (18.2)	6 (27.3)	-	-	7 (35.0)	2 (10.0)	9 (45.0)	2 (10.0)	.000*
Online journals of various publishers	AAP, AMA, BMJ, Karger, OUP, Sage, Springer, T&F, Thieme, Wiley-Blackwell, etc.	3 (10.3)	12 (41.4)	8 (27.6)	4 (13.8)	2 (6.9)	-	13 (8.1)	39 (24.4)	47 (29.4)	30 (18.8)	23 (14.4)	8 (5.0)	5 (2.1)	60 (24.9)	69 (28.6)	47 (19.5)	43 (17.8)	17 (7.1)	1 (4.5)	3 (13.6)	4 (18.2)	6 (27.3)	3 (13.6)	5 (22.7)	-	1 (5.0)	10 (50.0)	2 (10.0)	5 (25.0)	2 (10.0)	.006*
e-Books	e-Books	1 (3.4)	10 (34.5)	10 (34.5)	6 (20.7)	2 (6.9)	-	10 (6.3)	35 (21.9)	36 (22.5)	38 (23.8)	35 (21.9)	6 (3.8)	6 (2.5)	45 (18.7)	59 (24.5)	57 (23.7)	53 (22.0)	21 (8.7)	-	2 (9.1)	3 (13.6)	9 (40.9)	2 (9.1)	6 (27.3)	-	1 (5.0)	4 (20.0)	7 (35.0)	6 (30.0)	2 (10.0)	.003*

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MAJOR

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Summary highlights that high percentage (96.1%) of practical faculty members and postgraduate students who were having the expert computer literacy used Pub Med/Medline database daily or at least 2-3 times a week whereas number of them who were having above average and average computer literacy used it daily or at least 2-3 times a week are average 59% and 53% respectively. At the same time the study also confirmed that low (40.9%) and very low (10%) percentages of faculty and postgraduate students who were having below average and beginner computer literacy used PubMed/Medline daily or least 2-3 times a week. It is observable that among the online databases, Science Direct accessed daily or at least 2-3 times a week by 55.2% of faculty members and postgraduate students who were having expert computer literacy whereas same was accessed daily or at least 2-3 times a week by 36.9%, 24.5%, 18.2% and 10% of them who were having above average, average, below average and beginner computer literacy respectively. It is again observed that another database MD Consult accessed by 44.8% of faculty and postgraduate students daily or at least 2-3 times a week who were having expert computer literacy while 30%, 24% and 22.7% of them accessed the same database daily or at least 2-3 times a week who were having the above average, average and below average computer literacy respectively.

From the analysis, one can also see that 51.7% of medical faculty members and postgraduate students who were having the expert computer literacy accessed online journals daily or at least 2-3 times a week while 32.5%, 27%, 18.1% and 5% of them who were having the above average, average, below average and beginner computer literacy respectively accessed the same daily or at least 2-3 times a week. It can also be seen that 51.7% of faculty and students who used open access resources daily or at least 2-3 times a week were having expert computer literacy. At the same time 34.4% and 24% of faculty members and postgraduate students who were having above average and average computer literacy respectively accessed open access resources daily or at least 2-3 times a week.

Computer literacy associated with medical faculty members and postgraduate students' usage of web as a learning resource was tested using Chi-square, which showed significant difference in utilizing the web resources table 3. This means that medical faculty members and postgraduate students lack of computer literacy increased their non-use of web as a learning resource. This result found significant at 0.05 significance level. This proved that 'computer literacy' factor strongly influences the medical faculty members and postgraduate students' use of web as a learning resource.

MAJOR FINDINGS

- **Computer Literacy of the Medical Faculty and Students**

  The study reveals that majority of respondents (51.1%) possessed average computer literacy. The study also recognized that both faculty members and postgraduate students are almost equally skilled in the use of web resources (Table 2 and Figure 1).

- **Computer Literacy of the Medical Faculty and Students and Use of Web Resources.**

It can be understood that the medical faculty members and postgraduate students who were expert in computer literacy accessed the web resources such as Pub Med/Medline, MD Consult, Ovid SP, online journals of various publishers, open access resources/databases, etc frequently. Further, the faculty and students who were having above average computer literacy accessed web resources less frequently. Furthermore, the faculty members and postgraduate students who were having below average computer literacy did not access web resources frequently (Table 3).

The study proved that 'computer literacy' factor strongly influences the medical faculty members and postgraduate students' use of web as a learning resource as observed by Chi-square test table 3.

CONCLUSION

The development of medical faculty and students' computer literacy in the web environment is as urgent as ever. Wang and Artero stated that "searching for information, evaluating information and using the information responsibly are all critical components of information literacy. The difficulties users encountered on the web can be best solved by having them participate in the information literacy training", Wang (2005). He further said in his study that "lack of search strategies added to students' difficulties in finding the information they needed. To increase the effectiveness of information search, students need to utilize various search strategies". This study showed that the web was competing fiercely with libraries. The convenience of the web and easiness of obtaining information on the web will attract more and more medical faculty and students. This raises an urgent need for medical faculty and students to develop computer literacy skills and apply them in electronic information environment. Hence, it is recommended the medical college libraries in Coastal Karnataka to move aggressively to develop plans for users' computer literacy training. Computer literacy skills are essential to faculty and students for identifying information needed to address a given problem or issue, finding needed information, evaluating the information, citing information and using the information responsibly and student academic success. It requires joint efforts from librarians and faculty members to integrate computer literacy across the curriculum. They can form a partnership to situate the teaching of computer literacy skills to the context of courses.

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Retrospective Conversion: Automation Experience at Cardamom Planters Association College, Bodinayakkanur: Case Study

G. Mangai* and P. Ganesan**

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*Librarian
Cardamom Planters' Association College
Bodinayakanur

** Assistant Libraian
Alagappa University
Karaikudi

Corresponding Author
G. Mangai
mangai1974@yahoo.com

ABSTRACT

In this digital environment, it is the libraries responsibility to provide latest and timely information to the end users. Advanced technologies in Software field have developed so many major changes in every walk of life. Automation of Library not only saves the time of the Reader but also the time of the Library professionals and enhances the image of the library. In order to provide effective and efficient services to the user community, it is very much necessary to automate the library. In this connection, the CPA College library has been automated and the experiences faced during the automation process are discussed in this article.

Key Terms: Library Automation, Library Software, Library Management, Implementation of Library Software, Retrospective conversion, Library computerization.

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INTRODUCTION

Activities related to acquisition, cataloguing, circulation, serial control, and information retrieval are traditionally known as house-keeping operations. The above mentioned activities are highly labour intensive and the emergence of Information and Communication Technology (ICT) has changed the library work as so simple and influenced the very nature of the college library, Ravichandra (1992). Presently libraries are undergoing significant changes not only because of new outlook but also in functioning, services, collection development, and information processing, organizing and disseminating the same to the end users. The library and information science profession has undergone a sea change especially due to the impact of library automation, Mulla et.al. (2009). Automation can be done depending upon the type of the library and it is possible to computerize the entire library or some functions of the library. For example, in a public library, it is better to automate the circulation system, if it is special library; it is better to automate the serial and for university libraries, automating the acquisition system will be better option and slowly rest of the systems can be automated in phased manner. Advances in Information and Communication Technologies offering new ways to libraries to manage the information in effective and efficient manner and introducing the modern technology will be good solution to reshape the library, simplifying the library professionals' work and providing interactive services to the users Rajendran, et.al. (2007).

NEED FOR LIBRARY AUTOMATION

Due to advancements in technological developments and sharp decreasing prices of software, hardware and other accessories, and library professionals enthusiasm on accepting and implementing the library automation were some of the reasons for automating the libraries. For the long period, library is considered as one of the important social institutions which provided knowledge to all the user community and without the help of the library, no institute was considered as complete one. Continues reproduction of knowledge in the form of print and non print media and controlling of the same in effective and efficient manner compelled the library professionals to automate their libraries. Library automation has brought profound changes in the library and library professionals in terms of both technology and involvement. Library automation will help to store, organize and retrieve the materials in effective and efficient way. They can aid the library professionals to discharge their duties very fast and accurately by relieving the staff from repetitive clerical work, Rupinder (2012). As rightly pointed out by, Shivaram (2007) "Library automation improves the quality, speed and effectiveness of services and resources sharing among other library networks, Shivaram (2007)". Hence, automation of college library is therefore is the urgent need of the hour.

PROFILE OF THE COLLEGE

Cardamom Planters' Association College (CPA), Bodinayakkanur is run by Pranthiya Thenninthia Ela Vivasayigal Sangam, is affiliated to Madurai Kamaraj University started functioning on 19th July 1974 with two Pre-university sections. College offers various undergraduate, post graduate and M.Phil/Ph.Ds in some programmes.

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INITIAL STAGE: EXCEL SHEETS

Initially, the details about the library books and its locations were entered in excel sheets, which was very easy for the users to locate the required books. The process of circulation was performed manually. Library register for entering the book details and library issue cards were used for transaction of books. Since there are number of limitations in manual operations such as scrolling and viewing all the library books, efficient information retrieval, fine collection, and so on, automation was found as the only solution for procuring, organizing and disseminating the information in efficient manner.

PLANNING STAGE

Planning is the first step which requires thorough study of the existing system. A well planned action will help us to march towards success. Hence, basic requirements for library automation have been thoroughly studied before automating the college library.

The collection details of CPA College library was 20000 books, 10 journals and 500 reference and rare collection of historic books which have been identified for entering into the software.

Initially planned for completing databases such as books, journals and rare books up to 10-03-2011 and retrospective conversion work is in progress for total volume of books, journals and so on.

Cost involved in software, hardware, infrastructure facilities, manpower, training to LIS Professionals, orientation to the users and other miscellaneous cost have been worked out.

A thorough study about the available of library management software packages have been analysed before automation. and some of the below mentioned points have been considered for selection of the software.

- Reputation of the software (Company)
- Feed back from other library users
- Number of records, file and field size and so on
- Multi user access and multilingual facility
- User friendly
- Portability
- Cost
- Availability and clarity of documentation
- Support extended before and after installation
- Functions of the software and help messages
- Supporting on international standards such as MARC, Dublin Core, AACR-2 and so on.
- Training
- Warranty
- Maintenance of Annual Maintenance contract

ANALYSIS OF THE ROVAN LMS SOFTWARE

Automation is possible with the help of software and hardware. Both are very much necessary for automating the system and selection of software and hardware is the most important job in automating libraries, Mulla et.al. (2009). Based on above mentioned selection criteria, the library decided to go for ROVAN software package.

ABOUT ROVAN LMS SOFTWARE

ROVAN LMS is the integrated Library automation software for Schools, Colleges, Universities and other institutions. This software can be used to

- Manage the Libraries diverse resources efficiently.
- Provide detail reports and analysis to the management easily
- Provide easy to use search interface to users
- Save time in circulation

FEATURES OF ROVAN LMS

Following are the features of ROVAN LMS software package listed as below.

Flexibility

The software is very flexible and can be adopted to any organization irrespective of the size or type.

Barcode Support

Barcode printer and scanner can be attached to ROVAN LMS for automatic barcode generation in custom sized labels and scanning accession number, Member ID, ISBN etc.

Client Server Architecture

ROVAN LMS is built on client server architecture that imparts extra strength to storage capacity, multiple accesses to a single database, various levels of security, backup and storage facilities etc. The architecture uses SQL as back end and Visual Basic.Net as front end.

Enhanced Reports

ROVAN LMS helps to generate many detailed reports and analysis for better administration.

Advanced User Management

Multiple levels of users with different access permissions can be maintained.

On-line Help Manual

On-line help manual is provided along with the software. It helps in clarifying doubts readily and to training the new staff easily.

Hardware requirements of the software are

Server Requirements

CPU: Pentium P -IV

RAM: 1 GB (2 GB Recommended)

Operating system: Windows XP/Windows NT

Client Requirements

CPU: Pentium P-III

RAM: 512 GB (1 GB Recommended)

Operating system: Windows XP/Windows NT/98

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MODULES

ROVAN LMS provides both basic and advanced capabilities through the following modules:

- Acquisition
- Catalogue
- Circulation
- Serials
- Web OPAC
- Administration

Acquisition

Acquisition module helps to handle the major functions related to acquisition of library materials. This module covers the following functions:

- Ordering of materials
- Receiving of materials
- Payment
- Budget Control
- Reports and analysis

Catalogue

Catalogue module helps to catalogue all types of library materials. It covers the following functions

- Cataloguing process
- Catalogue search
- Catalogue card generation
- Stock verification
- Reports and analysis

Circulation

Circulation module takes care of all possible circulation related functions in a library. It covers the following activities

- Membership management
- Issue / Return / Renew / Reserve
- Overdue charges /fine
- Interlibrary Loan
- Maintenance (Lost, Binding, Damaged etc)
- Reports and analysis

Well designed screens enable to finish the transactions with few key strokes. Interface to the barcode system is provided for faster and accurate transactions.

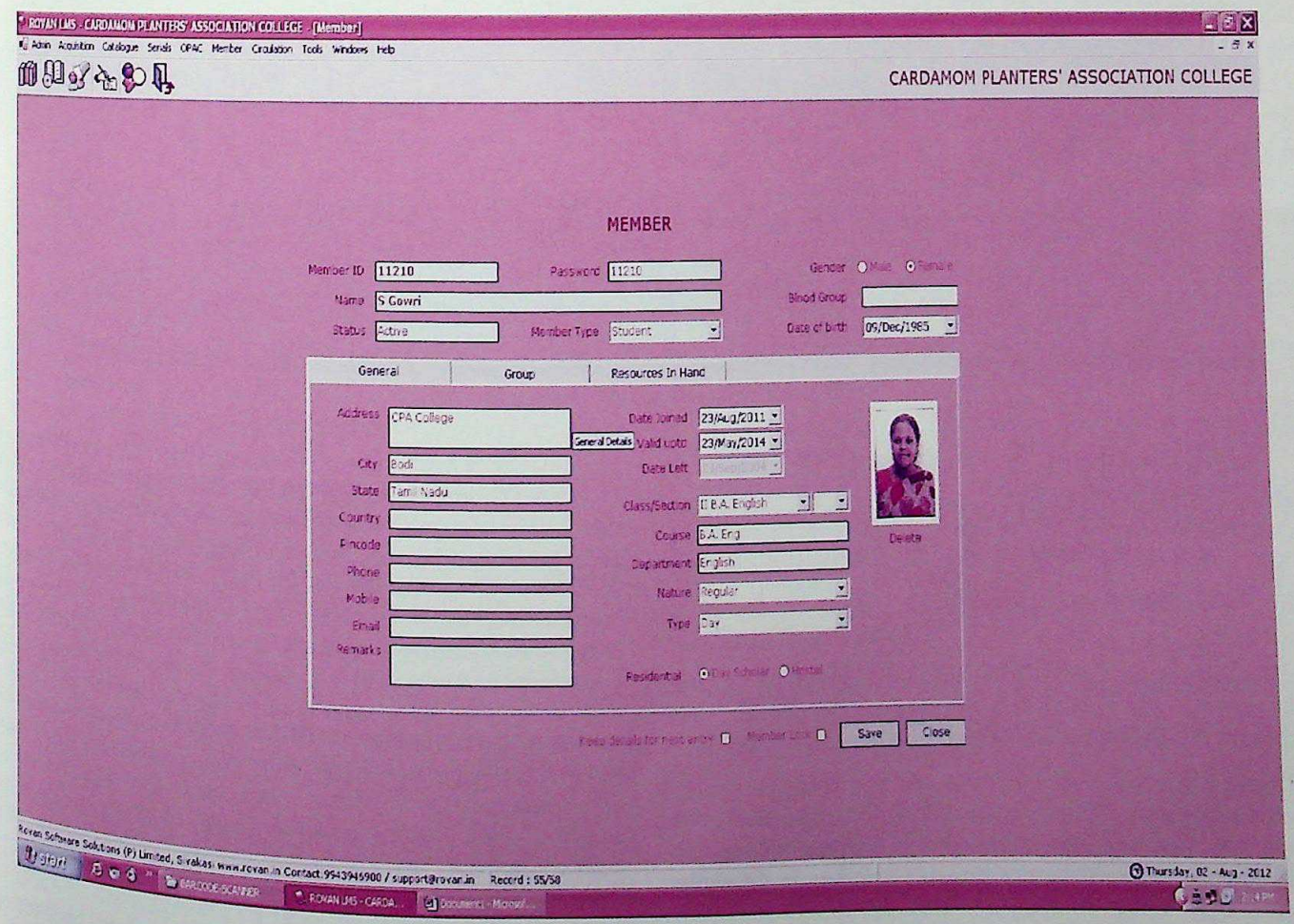

Fig. 1: Barcode System

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Serials

Serials module makes keeping track of serials an easy task. It covers the following functions.

- Subscription management
- Issue arrival schedule generation
- Checking in of issues
- Non receipt of issues / reminders
- Back volume management
- Reports and analysis

Web Opac

Web OPAC (On-line Public Access Catalogue) is a window to library collection. It helps the members to search for its available in the Library through intranet / internet by using

- Acc. No, Call no, Author, Title, Subject, Keywo Location, Publisher, Supplier etc,
- Boolean operators
- Wild card matching

The query result can be presented as a neatly forma bibliography in multiple sorting orders as required.

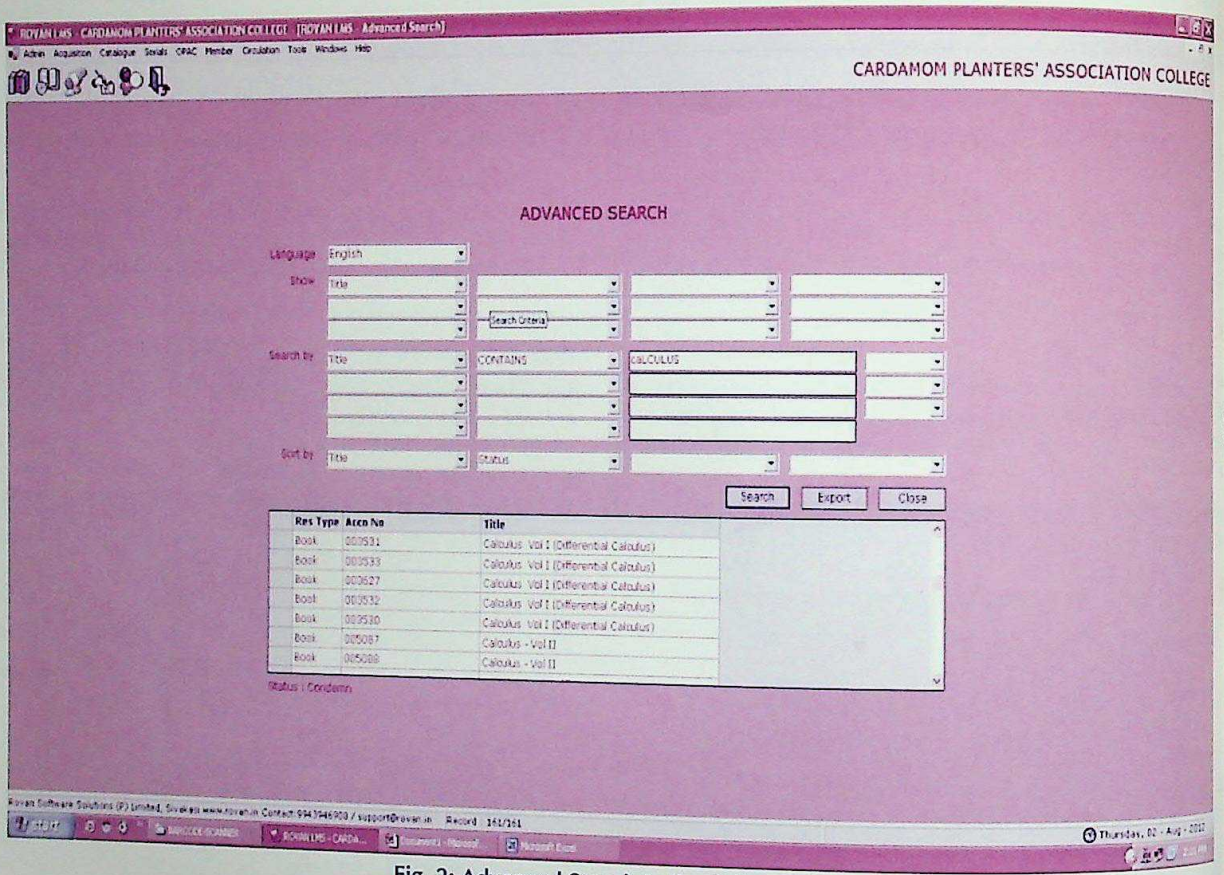

Fig. 2: Advanced Search in the Software

Administration

Administration module helps to perform the following functions.

- User management
- System Audit
- Backup
- Temporary Lock

DESIGN AND IMPLEMENTATION

The design stage is very important one and may take several months also. After carefully planned, designing stage started. The design stage involved careful appraisal of findings of the system requirements, proposals and alternative solution. In the design process, type of the library, size, functions or modules to be automated and the financial support for automation have been worked out. Library automation package procured thro University Grants Commission (UGC) fund, the cost involved the library automation process was hardware, purchase software, training to the library professionals, orientation to users, and other miscellaneous costs. A team with librar chosen the software, hardware, operating system, requirements, storage of data, retrieval system, method processing, updating of files and so on. Data entries for all boo journals and rare books have started entering into the databas on 10-03-2011. Presently books acquired are entered thro ROVAN LMS software and the entry process of all the docume are in progress. Other operational aspects like documentat site conditions, maintenance have been thoroughly discuss After the software and hardware have been selected, the o items like site preparation, problems with old system, testing new system, data conversion procedures, manpo requirements both library and information techno

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professionals have been considered. Modification changes automation. The findings experiences of the present study are have made in software, and the same have been documented.

The next stage of implementation involves the actual running of system. In the implementation stage, it should be decided, whether the entire system should be moved to new one or to be automated in phased manner. In CPA college, the data have been entered and circulation is being done through ROVAN LMS software package. Presently most of the operations are carried out through software and it is decided to perform all the operation through software package.

EVALUATION AND IMPROVEMENT

Evaluating the new system after some time will be better for finding the new systems efficiency and meeting the objectives of the goal of the organization. Evaluation programme is diagnostic one and once it is diagnosed, then curing will be easy. Once evaluation has been conducted, steps must be taken to improve the system.

In the college, the ROVAN LMS package has been evaluated and some of the limitations have been identified and steps have been taken to rectify the same.

STAFF DEVELOPMENT

Adequate training to all the library staff members is must and all the library staff members' participation in training is must. One person with having sufficient IT knowledge should take care of the automation package.

In the college, the ROVAN LMS personnel have given adequate training to handle the software without any problem.

Problems Faced While Automating the Library

- Backup facility
- Multilingual facility: whether the software helps for the data to enter in the local language and appearance of the same in that language (while retrieval).

Despite its shortcomings, the software has provided for easy reference to our library collection. Users can easily search for the availability of books using author, title, class number, accession number, free text and combination of search. Since all the sections are automated, it is found that circulation was matter of minute and all the repetitive works have been eliminated. Various reports such as user statistics, fine details, transaction, reminder and so on are very easy. The students, research scholars and faculty members have expressed satisfaction over the software. Overall, it is found that despite its shortcomings, use of ROVAN LMS software is very much useful and all are satisfied with the software.

FINDINGS

The present study has been made to understand the major issues which are involved in the planning and designing of library listed below followed by relevant suggestions:

- Hardware and software requirements for library automation are listed
- Selection of software is listed
- Major steps for planning and designing for library automation are provided
- Different modules, menu screens and special features of ROVAN LMS software are explained.
- Different functions and services provided by the library are explained and presently the library is automated

CONCLUSION

Automation is need of the hour for any college library, since most the library operations are repetitive. Though, the development of software is possible, it will be time consuming and designing the software according to the international standards will be cumbersome. The package introduced in our library supports for all activities carried out in the library. Automation relieves the library professionals from doing their repetitive clerical jobs and leads to job satisfaction and also enhances the image of the library. The staff and users are very much satisfied with software package, since it is simple and user-friendly. With this package, we are able to provide better services to all the users of Cardamom Planters Association College, Bodinayakkanur.

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Bibliometric Analysis of the DESIDOC Journal of Library & Information Technology for the Year 2007-2011

K. Thavamani

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Regional Medical Library,
The Tamilnadu Dr. M.G.R Medical University,
Guindy-Chennai

Corresponding Author
K. Thavamani
kottithavam2008@yahoo.com

ABSTRACT

Bibliometrics/Scientrometrics are one of the ways to measure the literature explosion. The present study is also intended to identify the growth and authorship pattern of productivity of articles of source journal "DESIDOC Journal of Library & Information Technology". It was observed from the study that the year 2008 was most participating year during the study period 2007 - 2011. The Relative Growth Rate (RGR) was high in terms of literature productivity and Degree Collaboration (DC) was also high in terms authorship pattern i.e., 108 out of 194 (0.556). and many more features were identified.

Key Terms: DRDO, Bibliometrics, DESIDOC, SIB, RGR, DC, Global Contribution.

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INTRODUCTION

DESIDOC Journal of Library & Information Technology is a well known journal in the field of library and information science published from NISCAIR, India and it is publishing topics relevant to the library and information science, like articles, documentation notes and research reviews on library, documentation and information science, information systems, services and products, information technology, information users, bibliometrics, scientometrics and informatics, education and training and other related areas.

DESIDOC started functioning in 1958 as Scientific Information Bureau (SIB). It was a division of the Defence Science Laboratory (DSL) which is presently called Defence Science Centre. The DRDO library which had its beginning in 1948 became a division of SIB in 1959. In 1967 SIB was reorganized with augmented activities and named Defence Scientific Information and Documentation Centre (DESIDOC). It still continued to function under the administrative control of DSL. DESIDOC became a self-accounting unit and one of the laboratories of DRDO on 29 July 1970. The Centre was functioning in the main building of Metcalfe House, a landmark in Delhi and a national monument. In August 1988 it moved to its newly built five-storeyed building in the same Metcalfe House complex. Since it became a self-accounting unit, DESIDOC has been functioning as a central information resource for DRDO. It provides Science & Technology information, based on its library and other information resources, to the DRDO headquarters, and its various laboratories at various places in India.

REVIEW OF LITERATURE

There are several studies by different authors analyzing the contributions of different journals of various fields. The growth scientific research literature on Orissa published during 19 2004. It includes 875 research papers from forty differe journals. The authorship pattern, year wise growth, subject w break up of papers, category of journals, place of origin, length papers, and productivity of journals, Mahapatra et.al. (2006).

The trend of publications such as the year wise distribution articles, bibliographical distribution of citations, authors pattern, citation pattern, average length of articles, number tables and figures used, time lag, geographical distribution authors and subject analysis have been studied, Jena et.al. (200

The productivity of authors and core periodicals has be determined using Lotka's and Bradford's law. Literature grow country-wise distribution and language pattern has also be studied. Literature growth in this area of LIS has been found to negative. Most of the papers have been contributed by sin authors (72.8%) and two authors (20.69%) and 72 % of literat is published in 72 journals, Mittal et.al. (2006).

The authorship pattern and collaborative research in physics w a sample of 11,412 journals and 1,328 book citations append in the physics doctoral dissertations awarded by the Ind Institute of Science, during 1999-2003. The team research preferred in the field of physics rather than solo research. T average number of authors per journal articles was 3 and books it was 1.69. The degree of collaboration in different ye was calculated and the average value of it for journals was 0 and 0.44 for books. The authorship collaboration is more journal articles than in books. The authorship pattern, the deg of collaboration and the average number of authors were differe in journals and in books, Pillai et.al. (2007).

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Doctoral degrees awarded in library and information science during 2003-2008 was collected from University News. Andhra Pradesh has produced the higher number of Ph.Ds during the period and information sources & services, user studies, library management and bibliometrics are the leading subject areas on which most of the research has been carried out, Madasamy et.al. (2009).

A total of 111 publications from 11 issues of PJLIS were published during 1995 to 2010. It has outstanding contribution in the dissemination of LIS research on national and international level as it publishes both in print and electronic format. A bibliometric analysis of contributions published in the PJLIS from 1995 to 2010 has been presented. The study all 11 issues of this journal on the basis of different parameters, viz., author productivity, extent of authors' collaboration, authors' institutional affiliation, authors' geographic affiliation, type of publication, language of papers, number of citations used per article, length of papers, and year-wise distribution of papers, Nosheen et.al. (2011).

The citation patterns in the Malaysian Journal of Library and Information Science (MJLIS) from 2001-2006, the number of publications has increased from the 76 articles in the Tiew study to 85 articles here, with statistically significant changes in the types of article, in the numbers of references per article and in the lengths of the articles. The complete set of 161 articles attracted a total of 87 citations, 52 of which were self-citations, with 14% of the MJLIS articles having been cited at least once, Bakri et.al. (2008).

The 131 contributions of the journal entitled' Annals of Library & Information Studies' published during 1999-2005. It examines year wise, institutions wise, state wise distribution of contributions, authorship pattern, citation analysis, length of the contributions etc. Most of the contributions of this journal are contributed by single author and state wise distribution shows that most of the contributions are contributed from New Delhi. Citation analysis of 1456 citations includes finding out average number of citations per contribution, types of publications cited and preparing of ranked list of cited journals in contributions of this journal. The journals are the most cited publication amongst the library and information scientists and the source journal i.e. Annals of Library and Information Studies is the most cited journal in the contributions of this journal, Verma et.al. (2007).

The biomedical literature of Nigeria was drawn from 295 journals in Medline through which papers on Nigeria were published during the period 1967-2002. The journals according to their subject heading and examined the potential impact factors of a sample of the journals based on Thomson's ISI Journal Citation Reports. Multidisciplinary journals and papers dominated the source types and were also more highly co-authored than the other subject headings; they also have the highest potential impact factor. The implications of this pattern of journal choice on biomedical research in Nigeria are highlighted, Williams et.al. (2006).

OBJECTIVES

- To identify the Relative Growth Rate (RGR) of the subject.
- To identify the author contribution towards the subject and its collaborative pattern in terms of Degree of Collaboration (DC).
- To identify the global contribution towards the subject.

METHODOLOGY

The DESIDOC Journal of Library & Information Technology has been selected as the source journal for this study. Twenty six issues of five volumes from 2007 to 2011 have been selected for the study purpose.

DATA ANALYSIS

For the purpose of this study, the Bibliographical data was collected from DESIDOC Journal of Library & Information Technology database from website for the period of 2007 to 2011. Collected data were statistically analyzed, calculated, tabulated and presented by using RGR method, Doubling Time and K. Subramanian's formula for Degree of Collaboration for its growth rate of the literature, author contribution and their collaboration, global participation towards the subject, trend of the subject growth and its grey areas etc.

Table 1: Year wise Distribution of Records

S. No.	Year	Articles	% of Records
1.	2007	33	17.01
2.	2008	50	25.77
3.	2009	49	25.26
4.	2010	46	23.71
5.	2011	16	8.25
	Total	194	100

The table represents the year-wise distribution of articles published in DESIDOC Journal of Library & Information Technology. It shows that details regarding the distribution of 194 articles published from 2007-2011. Maximum 50 (25.77 %) articles was published in 2008 and minimum number of contributions i.e., 16 (8.25%) in the year 2011.

Table 2: Author-wise Distribution of Records

Authorship Pattern	2007	2008	2009	2010	2011	Total	% of Records
Single Author	18	32	16	14	6	86	44.33
Two Authors	9	10	21	25	8	73	37.63
Three Authors	4	5	8	5	1	23	11.86
More than Three Authors	2	3	4	2	1	12	6.18
Total	33	50	49	46	16	194	100

The above table depicts the details about the different pattern of authorship collaboration was held during the study period for contributing an article. Out of 194 articles, individually responsible authorship owned about 86 (44.33%) and it was maximum score in the overall productivity during the study period.

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Next to it, the 73 (37.63%) articles were contributed by two different authors collaboratively. In 2010, maximum articles were contributed jointly by two different authors i.e., 25 (54.35%) and more than three authors was contributed only 12 (6.18%) and it was the least contribution in overall study period.

Table 3: Authorship pattern with Degree of Collaboration

Year	Volume	No. of Authors		Total	Degree of Collaboration
		Single	Multiple		
2007	27	18	15	33	0.454
2008	28	32	18	50	0.36
2009	29	16	33	49	0.673
2010	30	14	32	46	0.695
2011	31	6	10	16	0.625
Total		86	108	194	

$$DC = \frac{108}{86 + 108} = 0.556$$

It was observed that the Degree of Collaboration was high i.e., 108 (0.556) in terms of collective contribution and individually responsible authors' contribution was less towards the subject. (i.e., 86) The result was extracted by using the K. Subramanian's formula for Degree of Collaboration.

Table 4: Country-wise Distribution of Records

S. No.	Name of the Country	2007	2008	2009	2010	2011	Total	% of Records
1.	Bangladesh			1			1	0.51
2.	Canada		2				2	1.03
3.	Dubai, UAE		1				1	0.51
4.	Greece		2				2	1.03
5.	India	31	31	46	46	14	168	86.59
6.	Iran			1			1	0.51
7.	Nigeria					1	1	0.51
8.	Singapore	1	4	1		1	7	3.60
9.	Spain		1				1	0.51
10.	Sri Lanka	1	1				2	1.03
11.	Taiwan		2				2	1.03
12.	United Kingdom		3				3	1.54
13.	USA		3				3	1.54
	Total	33	50	49	46	16	194	100

it was observed that there were 13 countries (including India) contributed towards the subject field. Among them, India was highest contributor during the study period i.e., 168 (86.59%) according to the study that the year 2008 was remarkable yea terms of articles productivity.

And the Singapore was the highest contributor among the fore counties towards the subject field i.e., 7 (3.60%). Rest of foreign countries had also contributed to the subject field du the study period.

Table 5: Institution-wise Distribution of Records

Institution	No. of Authors	% of Records
Academic Institution	107	55.15
Research Institution	72	37.11
Special Institution	15	7.73
Total	194	100

The table shows institution wise distribution of contributions this DESIDOC Journal of Library & Information Technology. O of 194 contributions, the highest number, i.e., 107 (55.15%) h been contributed by Academic Institution and lowest numb i.e., 15 (7.73%) has been contributed by Special Institution.

Table 6: Relative Growth Rate and Doubling Time

Year	Volume	No. of Issues	Total No. of Output	Cumulative Total	RGR			D
					w1	w2	(a1-y2)	
2007	27	6	33		3.49			
2008	28	6	50	83	3.91	4.41	0.92	0.
2009	29	6	49	132	3.89	4.88	0.99	0.
2010	30	6	46	178	3.82	5.18	1.36	0.
2011	31	2	16	194	2.77	5.26	2.49	0.

The above table represents the literature growth pattern based relative growth rate (RGR) and Doubling Time (DT). Based on study relative growth rate was high and doubling time correspondingly less than RGR. It was identified from anal that growth of the literature was gradually increases.

CONCLUSION

There was steady growth of research contribution among Library and Information Science researchers during 2007 2011. More number of academic institution as well as professionals to be actively and specifically involved in subject areas such as E-Resources, Information Communication Technology, Bibliometrics /Scientometr Information Sources and Services, LIS Education, Classifica and Indexing and Information Literacy which are most pop subjects of LIS are published.

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Open Source Cloud Computing Software and Solutions for Libraries

Mayank Yuvaraj and Ajay Pratap Singh

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Dept. of LIS
Banaras Hindu University
Varanasi

Corresponding Author
Mayank Yuvaraj
mayank.yuvaraj@gmail.com

ABSTRACT

Open Source and Cloud computing are two facets of service offerings where the open source provides an essential foundation for cloud computing services through the Internet. Cloud Computing is an emerging concept that strives to democratize computing power making it location and device independent. The current paper attempts to investigate and decipher the existing resources of cloud capacity that can be implied in Indian libraries. It presents a snapshot of various open source cloud based operating systems that are an important integrated tool to use the various computing activities that we installed or downloaded on traditional computers.

Key Terms: Cloud Computing, Operating System, Open Source, Libraries, Software.

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INTRODUCTION

The ultimate obstreperous technology in the library sector since 90s has been internet radically transmuting the conventional approaches to information management. Internet has been adequately obstreperous to an extent that it questioned the existence and need of libraries and in order to justify themselves librarians kept their mission and services at bay and involved themselves in IT issues. However, with the deployment of cloud computing library professionals can again focus on their mission and services then being involved in IT issues. Further, most of the cloud infrastructure is available as open source that can be easily customized. Although, switching to any technology is slightly risk averse for libraries yet implication of cloud computing is the only path for technological salvation. Implication of cloud computing has been surprising contentious among savants, although there is general agreeme that the basic technology will bring resiliency in library sector.

CLOUD COMPUTING AS A DRIVER OF CHANGE

Influx of IT had substantial impact on library sector. It sho the very foundation of the libraries and brought winds of chan leading to virtual services. It has been dominant to such an exte that most of the people don`t want to come to libraries inste prefer to get services through internet. In such a situation librari need to adept it to keep pace with the changing needs and serve people with information in a global cloud ecosystem. T introduction of the internet to libraries was part of a significa shift from print/in-house-focused services to online/ extern provided services, Mitchell, (2010).

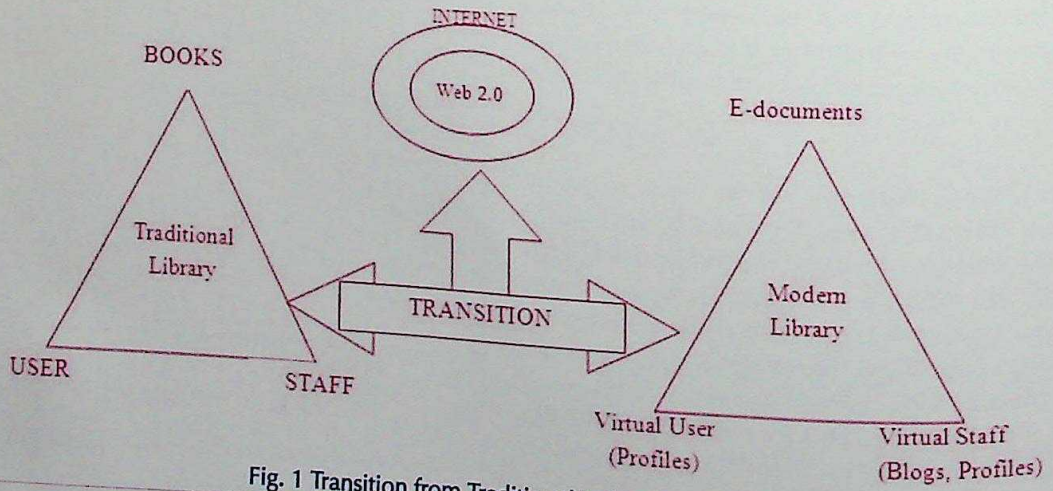

Fig. 1 Transition from Traditional to Modern Library

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OPEN SOURCE CULTURE

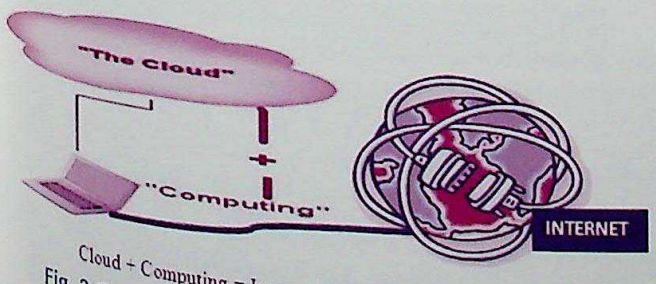
Open Source is used to connote any end product that is developed collectively and is accessible to everyone at no cost. Open source and Cloud computing share a symbiotic relationship. Open source provides an essential foundation for cloud computing. Providers of SaaS like Google rely heavily on the open source operating system Linux to run their machines, Hardisty et.al. (2009).

Open source software is fundamentally linked to the rights of software. In open source software the source text is available freely and the user has the right to modify it and several users can exchange improved versions among themselves. Moreover, open source world supports open standards. The development of the Internet from its beginning in the 1980s and 1990s was in several ways linked to the open-source philosophy. The successful development of these programs showed that extremely complex programs could be developed as open source. A generation of software developers, network people, system administrators etc. acquired positive experience of the spread of technology based on open standards and available source text by participating in the development of the Internet, Danish Board of Technology (2002). The development of open source software reached to a stage that software developers thought of a modern website that contained word processing and other functions delivered via web. For example, there is no need of software to track the consignments for your speed post. Also, the posts of your Facebook and emails are stored and organized on internet. This philosophy led to the concept of offering Software as a Service via Internet and marked the implications of cloud computing. Hardisty et.al. (2009).

The Amazon cloud first offered Linux machines and continues to offer new services on Linux first. Additionally, the low-friction licensing of open source software is a natural fit for cloud computing. Commercial vendor often hesitate to fully support their products in a cloud computing environment. Setting up free stacks of open source software and making them available will be a powerful model for computing forward, Hardisty et.al. (2009)

CLOUD COMPUTING

Cloud computing is used as a generic term for computing solutions where software and services are provided over internet. Cloud is used as a metaphor of internet while, computing refers to the use of computers and their implications to do a task. It is based on cloud drawings used to represent telephone networks and to depict internet.



Cloud + Computing = Internet based computing

Fig. 2 Conceptual Framework of Cloud Computing

It is considered as effortlessly usable virtualized computing assets (hardware, platforms and services) offered over internet. Through cloud computing, IT related capabilities are provided as a service to external customers using internet technologies. It connotes fifth generation computing where computing services are provided as a utility like electricity and water. The biggest advantage of cloud computing is that everything is in the cloud. Most of the software is open source however some of them charge according to its use. A user simply needs an internet connectivity as well as cloud operating system to harness the services on offer in the cloud.

According to McKendrick (2012) cloud computing landscape has no clear leading vendor, but rather is a mosaic of services. Although, the commercial opportunities are enormous, open source clouds are beginning to dominate the private cloud side of the market.

According to the survey conducted by right scale, Inc on 651 companies out of 64% of the respondents 41% plan to use only open source based private cloud options while 29% use a combination of open source and VMware and 30% respondents plan to use VMware only based private cloud options.

OPEN SOURCE CLOUD COMPUTING

For accessing the competencies of cloud computing one needs cloud operating system. Various operating systems for harnessing the competencies on offer from cloud have been developed. Some of the potential open source cloud operating system providers are:

- GLIDE
- myGoya
- KOHIVE
- ZIMDESK
- CLOUDO

❑ GLIDE

It is a cross-platform web based desktop developed by TransMedia Corporation in September, 2001. It is compatible with variety of web browsers. You simply need to sign up in glidesociety.com.

Fig. 3 Web Interface of Glide Desktop Registration

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After signing up you will get a web based desktop as under. Now you will be offered all the services on a virtual desktop:

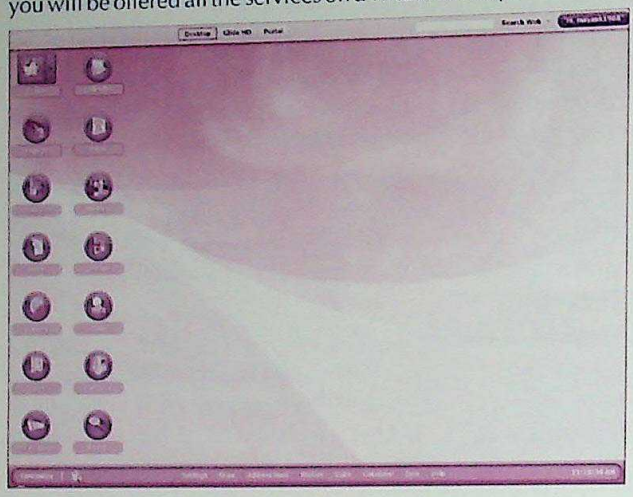

Fig. 4 Glide Desktop Interface

FEATURES

- It consists of a desktop-like virtual interface which imitates a desktop environment.
- It consists of several web-based applications like integrated office-suite, media players, photo-editor, calendar software, webmail, address book, micro-blogging service, publishing platform and Internet search client.
- It is a comprehensive Ad-Free cloud computing solution.
- It is free from daily bombardment of pop ups, banners, and streaming ads and email spam.
- It provides more storage, more features and more control over sharing private information and personal files.
- It provides facilities of desktop monitoring where up to six family members and child accounts could be administered.
- It has facilities to upgrade the online cloud storage from 30 GB to 250 GB

❑ myGoya

It is a portable web based cloud operating system independent of geographical location. In traditional computing there are different tools which are available with your OS, plus a mix of other different tools that can be download to your computer during need.

Some of these include an email aggregator, the ability to chat, a storage system for your files, sharing capabilities for your media, a media player that can go through play lists including photos, music, and videos, bookmarks, a notepad, a calendar, and more. The design is sleek and allows you to feel right at home on any computer anywhere and with all of your files and tools right at your fingertips. Instead of having to download different chat systems, media players, and file sharing software, you can get it all just from logging into their website.

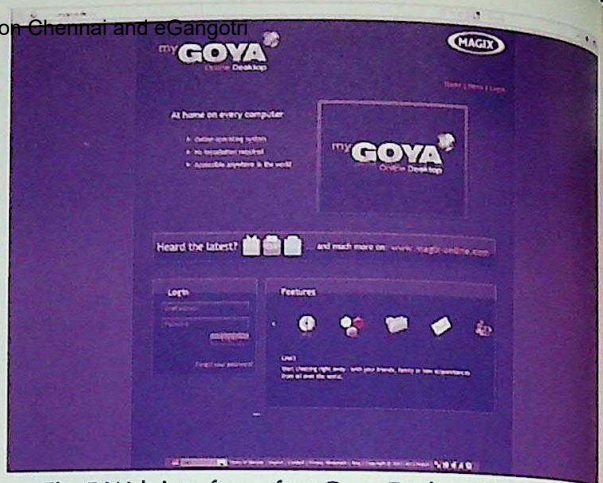

Fig. 5 Web interface of myGoya Desktop Registration

FEATURES

- It is available in beta version which does not require a installation and users can get a free account to try it.
- It offers Web disk facilities i.e. an illusion of hard disk the web where all data can be saved online free fro data losses, corrupted hard disks and thefts.
- With its feature of Sharebase one can manage t accessibility to data. A user can share media, offi documents, appointments, and notes with the selecte people in the contact lists.
- File Manager keeps a control over the Web disk whi manages multimedia and other files spontaneously li a regular operating system.
- Mail facilities presents all email accounts from a provider in a single program where one can wri receive and manage mails directly in an onli environment.
- It is accessible anywhere in the world.

❑ KOHIVE

Kohive is an online collaborative workspace that mimics computer desktop by design. It is based on the notion that m people work from varied geographical locations which needs be supplemented by services like social networking, file shari and email. For accessing the Kohive desktop you simply need sign up in www.kohive.com.

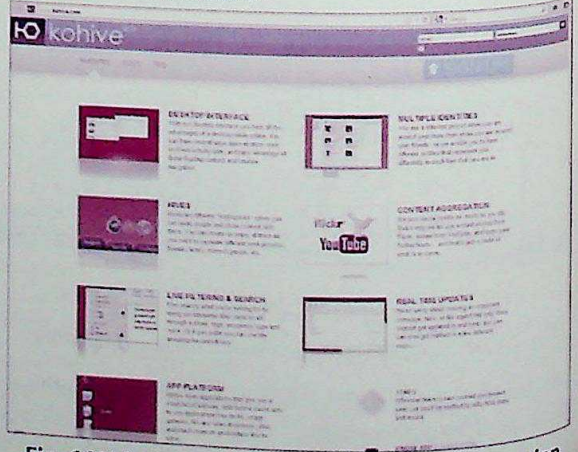

Fig. 6 Web Interface of Kohive Desktop Registration

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After successful registration you will be offered an online desktop as under:

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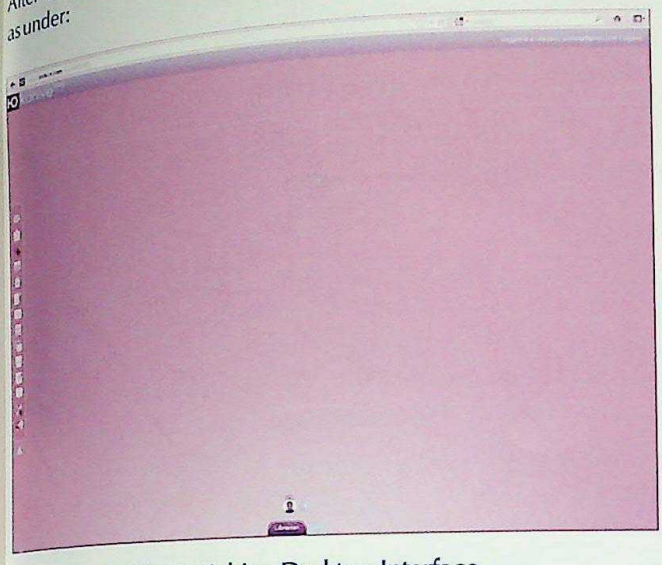

Fig. 7 Kohive Desktop Interface

FEATURES

- It offers an online desktop.
- Several apps can be opened at once, worked on them side-by-side, and one can also take advantage of faster content loading and intuitive navigation.
- It contains options like Overview, Messages, Bookmarks, Stickies, Tasks, Notepad, Status Updates, File Cabinet, Gallery, Videos, Doodle, Chat Room, Settings, Feedback,
- It offers online sharing facility called "Hive".Hives are different "workspaces" where one can invite people and share content with them. One can create as many of them as one wants to separate different work projects, friends, family, interest groups, etc.
- It offers filter panel for searching that can shift through authors, tags, recipients, type and more. Or if one prefers one can use the amazing live search box. APP PLATFORM
- Unlike other applications that give you a short list of features, with Kohive you're able to use applications like tasks, image galleries, file and video directories, chat, and much more on an interface like no other.
- Soon Kohive is going to open its API to developers so they'll be able to make new applications and distribute them though an app store.
- It offers the facilities of having different profiles that represent you differently in each hive that you are in.
- It has the option to embed photos from Flickr, videos from YouTube, and sync your Twitter feeds
- Users need not to worry about missing an important message, task, or file again! Not only does content get updated in real-time, but you can also get notified in a few different ways.

ZIMDESK

Zimdesk is virtual CPU on the web. It constitutes desktop, operating system and favourite applications which are all available online. Zimdesk is available as both a subscription web-based service and enterprise version for business, government and education.

For accessing the services of Zimdesk one needs to sign up through our quick registration.

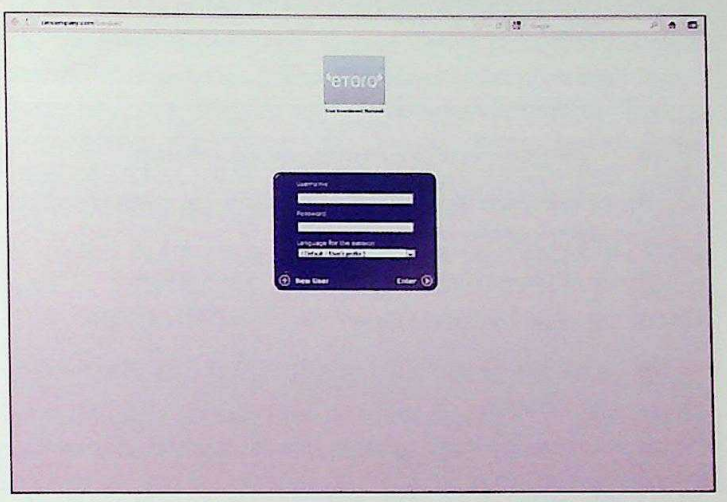

Fig 8: Web Interface of Zimdesk Registration

Zimdesk is easy to use and has been designed to ensure an enjoyable online experience. After signing up one can explore numerous features and functions available on Zimdesk.

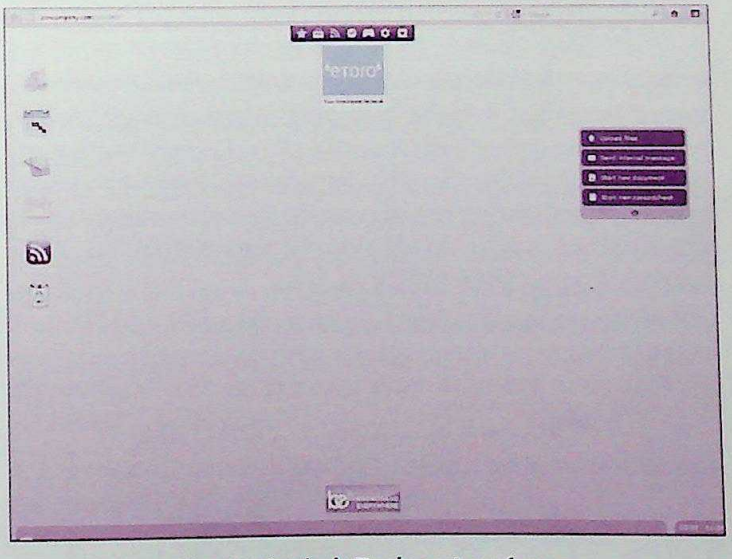

Fig. 9 Zimdesk Desktop Interface

FEATURES

- It is free to use but users can upgrade their accounts with paid for options for extra web space and web services
- Zimdesk Premier offers unlimited work space, unlimited no. of groups and invites - with added 128 bit SSL security
- It provides a virtual desktop
- A massive 2Gb personal work space is also available
- It consists of features like Online Drive and file manager

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- It can create and manage up to 100 public or private work/interest groups
- It offers advanced features for permission-based group functionality
- One can upload and manage audio and video files on Zimdesk
- It also has options to create and manage Wikis
- One can create and manage personal and work-related Blogs
- It has features to add RSS feeds for the entire site, groups and individual users
- One can create and manage image galleries
- It offers facilities of social bookmarking - with searching within bookmark descriptions
- It also contains features like spam protection
- It offers 128 bit security
- One can project calendars and event calendars for site-wide events
- It provides configurable user profiles with searchable descriptions
- It also has features to create lists of "contacts" among site members
- It also contains suite of web-enabled "office" applications, including; word processor, spreadsheet.

❑ CLOUDO

In the recent years the transposition towards cloud computing has gained impetus. It is the brainchild of Hakan Bilgin, System Architect who brought the idea of a cloud OS from the drawing board to fruition. The Cloudo Company is a Swedish start-up, a 5 man team, with an interesting product: a virtual operating system like running Linux inside VMware, but their servers does all the legwork for you, Neagu (2009).

The Cloudo desktop interface appears as under:

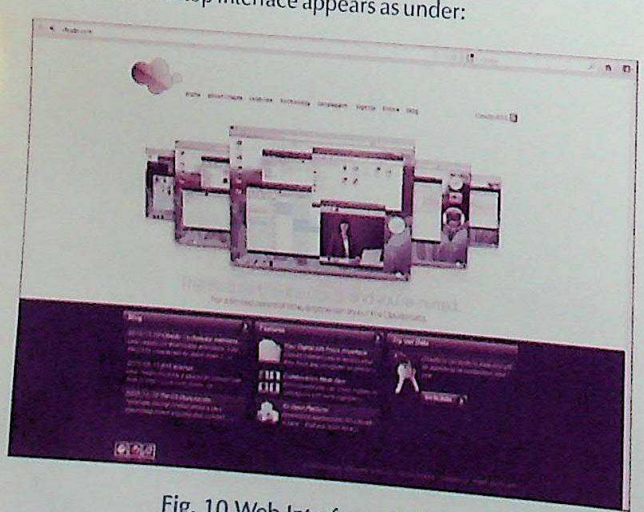

Fig. 10 Web Interface of Cloudo

For getting the services of Cloudo one needs to sign up for an account on www.cloudu.com.

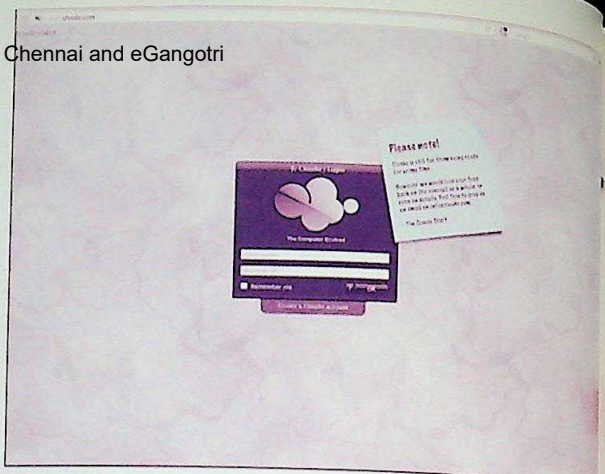

Fig. 11 Web Interface of Cloudo Registration

After signing up on login user is provided with a virtual desk

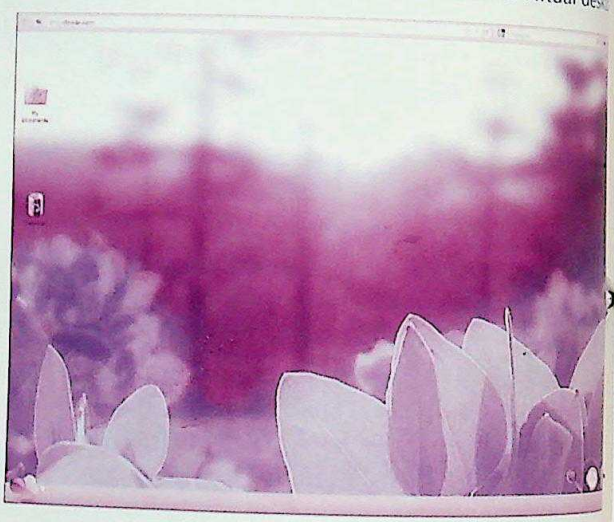

Fig. 12 Cloudo Desktop Interface

FEATURES

- It is Internet operating system available free of charge
- All the documents at Cloudo desktop are access from any computer connected to the network.
- It offers facilities for developing applications for wh there is a "revenue share" program.
- It consists of transparent menus, big icons, buil search tool in the menu and one click accessibility frequently used applications.
- It offers apps like Application manager, Text pad editor), Champ (audio player), Calendar, Weat Widget and a RSS Reader.
- Its server runs on LAMP (Linux, Apache, MySQL, PH
- It is mobile, cheap and low-end hardware solutio computing.
- It can be used as default computer or side by side with work or home computer.

FOSS CLOUD COMPUTING

FOSS (Free Open Source Software) is the standard for opera systems to user applications, for individuals to large enterp

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developed on the concept of "free software" by Richard Stallman. FOSS is developed to meet the lowest risk choice for software systems today. All FOSS licenses specify that the software is available to use, modify, and distribute at no cost. With the increasing synergy between free open source software and cloud computing FOSS has strived to solve the prime concerns of cloud-control of software and data for avoidance of lock-in. FOSS has enlisted various resources for open source cloud computing.

FEATURES	SOFTWARE
IaaS (Infrastructure as a Service)	Cloud Stack Eucalyptus Nimbus Open Nebula Open Stack Open Virtualization Alliance Reservoir
Management Software	Delta cloud Jclouds Libcloud
SaaS(Software as a Service)	Alfresco CiviCRM Collabtive EGroupware Nuxeo OpenERP Opentaps OrangeHRM VTiger

FOSS Cloud Computing

IMPORTANCE OF CLOUD COMPUTING SERVICES IN LIBRARIES

It is an act of bravery to keep pace with the technology which has always an element of dynamicity. Unconsciously, librarians and users are effectively making use of cloud computing to fulfill their needs. Cloud simply offers a bunch of services provided through various universal centers and built on servers, Scott (2010). It enables users a facility that often appears as single point of access for customers computing needs & specifications.

There is an utmost need to understand the intricacies of cloud computing and the competencies on offer which can be applied in libraries. There is also a need to see the feasibility of the concept. The growing internet usage among library users and the time these users spend on the internet has made it imperative that libraries offer their services online. Users of information have more attractive ways of finding information than using the traditional library. Today, library users are accessing the information needed from the comfort and security of their homes or in their own personal or customized spaces, Beharilal (2011).

However there is a futuristic essence in cloud computing for libraries. Cloud computing is beneficial when expertise is lacking and where future computing needs are unsure. It enables libraries to stop dealing with technical issues that have nothing to do with their day-to-day mission and services, Moulasion (2011).

Cloud services allow for more optimal resource utilization, easier access, and more effective cost reduction, Vaquero et.al. (2009). The growing internet usage among library users and potential users, plus the time these users spend on the internet, has made it imperative that libraries offer their services online. Today`s consumers of information have more alternative and attractive ways of finding information than using the traditional library, Sadeh (2007).

The future of computing lies in cloud computing, whose major goal is reducing the cost of IT services while increasing processing throughput, reliability, availability and flexibility and decreasing processing time, Hayes (2008). Cloud computing will bring an end to the ILS server, Wolf (2010). Recently, OCLC started Web scale management services which can perform the in-house library operations through mutual co-operation. It will provide all its web-scale subscribers with a vendor database which will list their details avoiding data redundancy in libraries. Libraries can work cooperatively in a flexible environment where they can share solutions to problems instead of having to reinvent the wheel at each library. OCLC web scale management services (2010). Migrating to a cloud-based application may turn out to be cost neutral but at the same time still have the benefit of allowing staff to concentrate on library-specific issues, Moulasionet.al. (2011).

Other vendors can take advantage of the cloud. Vendors can provide a remotely hosted service which allows for the creation of modular content, which many libraries wouldn`t be able to create on their own. It also lowers the technical skills needed to create web pages. Like other cloud applications it is accessible from any internet connection, so you don`t need a client on your local PC, Wolf (2010). Moreover, through cloud computing instead of having own servers and employing personnel for its maintenance libraries can hire a vendor on a monthly charge and enjoy the benefit of same server function.

A brief list of potential areas of improvement could include Goldner (2010):

- Most library computer systems are built on pre-Web technology
- Systems distributed across the Net using pre-Web technology are harder and more costly to integrate
- Libraries store and maintain much of the same data hundreds and thousands of times
- With library data scatter across distributed systems the library's Web presence is weakened
- With libraries running independent systems collaboration between libraries is made difficult and expensive
- Information seekers work in common Web

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environments and distributed system. Make difficult to get the library into their workflow

- Many systems are only used to 10% of their capacity. Combining systems into a cloud environment reduces the carbon footprints, making libraries greener

CONCLUSION

Cloud computing technologies promises new opportunities and service offerings for the library and information service practices. With the idea of keeping computing services and software somewhere unknown at remote datacenters eradicates the problems of media and format obsolescence threats faced by the libraries. The rewards of cloud based library services are really worth to the future of libraries. Most of the features are already available in the cloud before the term cloud computing came into consciousness of the people. There are three powerful drivers of cloud computing to the library services: organizational needs, user requirements and better services. The realization of amorphous cloud computing based libraries offers ample space for the librarians to focus on their services and content rather than being involved in the information technology activities. Libraries can harness the potential of cloud computing in data sharing, developing information discovery tools, email systems and social networking. To provide accessibility to these services library needs cloud based operating systems. However, with the availability of various open source cloud based operating systems library are blessed to migrate their data and services on the cloud landscape.

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Preserving the Past and Building the Future: The Role of Private Custodians of Manipur Manuscripts

Thiyam Satyabati Devi

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Assistant Librarian,
University of Swaziland

Corresponding Author
Thiyam Satyabati Devi
Satya115@rediffmail.com

ABSTRACT

Libraries and librarianship were existed long before but still manuscripts libraries were mostly imperial or private institutions. Access was limited to users. The trends have started changing with the advent of the library reform movement which advocated the building of more libraries opening them to all persons. The manuscripts of Manipur are also in the hands of the private custodians so it should be preserved because they contain the forgotten speeches and writings of native founding. Preserving the rich cultural heritage of a society constitute a basic component of the UNESCO's memory of the world programme. In this milieu, the paper has been prepared to present the role of Manipuri manuscripts in Manipur.

Key Terms: Manuscripts, Cultural Heritage, Digitization, Database, Accessibility.

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INTRODUCTION

Manipur the jewel of India is one of the seven states of North-East India. Manuscripts of Manipur are one of the precious materials of knowing our cultural heritage. It is from these manuscripts the history of Manipur have been traced. Majority of Manipuri's appreciate the valuable and extremely significant nature of Manipuri manuscripts such as origin of different clan and royal chronicles. The manuscripts of Manipur are mostly written in Meitei Archaic which have been used in earlier time so it is difficult for anyone to read it. The scholars who were the custodians of those manuscripts transcript it in Bengali script so that anyone can read it. But still there are lots there to be done to make them accessible to the public. Most of the manuscripts of Manipur are in the private custody and they were not easily accessible to the public. They kept it as sacred entity and preserved in their own way following the old tradition. Some of them were deteriorating so is high time to start preparing for preserving these manuscripts for future generations too.

AIMS & OBJECTIVES

The aim and objective of the study are:

- To make easily accessible every information available with different private custodians;
- To bring a co-ordination & co-operation among different custodians for providing better services to its course users;
- To make available to course users every information regarding available material on internet;
- To suggest some practical solution of possible difficulties in the way of networking among the custodians;
- To convert these libraries network as an resource centre;
- To bring these Resource Centres as a source of valuable information at international level accessible to all from a place of their choice;
- To make available the existing information to coming generation by preserving through computerization;
- To raise an awareness of saving the invaluable heritage by using best available method of storing;
- To make available every information for future research scholars;
- Analyse the problems faced by the scholars in searching the information from the Manuscripts;
- Find out the possibility for the transfer of the format of Manuscript from paper to electronic media i.e. computer and other information technology;
- Design a suitable model for easy retrieval of information from the Manuscripts.

VALUE OF MANUSCRIPTS

The principle and policies for the study of Manuscripts have come to be recognized gradually. There were hundreds of catalogues of medieval manuscripts collection but few of them were more than descriptive lists and generally rather poor ones from the

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standpoint of accurate cataloguing. Although the manuscripts performed invaluable services in rescuing manuscript they contribute little to palaeography as a science since their primary objective was to get a text in print often regardless of its accuracy. The value of manuscripts in the society is manifold as it obliges as a unit of the world memory and promotes the intellectual heritage. It also acts as a gateway and repository of knowledge to serve the indigent scholars.

DESIGN/METHODOLOGY

The research has been undertaken in order to make a documentation of the invaluable materials which are owned by the private custodians of Manipur. The following methods and techniques have been installed:

- Extensive survey of the custodians.
- Designing a format for recoding details about their collections.
- Interviewing the custodian to draw different views regarding their maintenance.

MANUSCRIPTS WITH MANIPUR CUSTODIANS

Manuscripts are important sources for the reconstruction history of a country likewise the manuscripts of Manipur are treasure for reconstructing the history of Manipur. manuscripts of Manipur are with the private custodians and preserve in their own way. They keep as a sacred entity and allow using it any time. So it is difficult for the research schola get the information from these manuscripts. Moreover manuscripts are written mostly in Meitei archaic which has b obsolete for years and the younger generation are not able to so it need to be transcribed in Bengali scripts. Time has chan the Meitei archaic which was obsolete years ago are now again. So the problem of transliteration has lessened but Preservation and Conservation is concerned. The Manuscr survey of India has taken up the project of digitizing manuscripts but still is in the infant stage. The state archive the museum collect the manuscripts but they are not able collect from each and every custodian. Some of the custodi who have rich collection of manuscripts are identified in survey. The custodians belong to different interest group teachers, scholars, writers, artist, professionals, social work religious persons etc. Below is the list of the custodians:

1.	Atombabu research centre, Imphal	2.	B. Roshan Manuscript Library, Imphal
3.	Dinachandra Singh, MML, Imphal	4.	Guru Sagolsem Kalidaman Singh Collection (SKS), Imphal
5.	Hijam Romoni Singh Collection, Imphal	6.	Khulem Chandrasekahr Singh
7.	Manipur Sahitya Parishad, Imphal	8.	Manipur State Archeive, Imphal
9.	Manipur State Kala Academy, Imphal	10.	Manipur State Museum, Imphal
11.	Mutua Museum, Imphal	12.	N. Indramani, Uripok Imphal
13.	Natum Sangeeta Academy, Imphal	14.	Oinam Bhogeshwor, Imphal
15.	People's Museum kakching, Kakching	16.	Pt. Thangjam Chandrasingh Memorial library, Imphal
17.	Pt. Ningthoukhonjam Khelchandra, Impahl	18.	Yumnam Dhanajoy Singh Colletion (YDS), Imphal

List of Custodians which has a rich collection of Manuscripts

PROBLEMS ENCOUNTERED DURING THE SURVEY

In most of the surveys, difficulties were encountered during the data collection period and most of them were similar in all places. One of the most common problems encountered by the researcher is the limited time and the information to collect is numerous. The researchers had to collect the primary data from a considerable number of places regardless of the geographical location. Some of the problems faced during this survey are:

- Custodians keep them as a sacred entity;
- Not easily accessible;
- Decline to disclose their collections;
- No systematic organization of the collections.
- Maintenance is not sensible so some of them are deteriorating.

WORK DONE IN INDIAN SCENARIO

The manuscripts survey of India has carried out a National Survey for an intensive state-wide programme with the aim to loca every manuscript in the country. The Mission has identified m than one thousand institutions in the country and aboard with repositories of Indian Manuscripts. It also identified Manuscripts Conservation Centres (MCC's) all over the cour for taking up work related to conservation of manuscripts and Manuscript Resource Centres (MRC) across the country for tak up work relating to survey, listing, cataloguing and for conduct awareness campaigns. Out of the 24 (MRC) the Manipur St Archives, Imphal under the Directorate of Art & Cultu Government of Manipur is one of them.

CHALLENGES OF PRESENT STUDY

The Manipur State Archives, Imphal along with the nation mission for manuscripts are trying to maintain all the manuscripts and provide service to the scholars efficiently effectively. But still it is felt that a separate establishment resource centre is required to satisfy the information needs of researchers of Manipur state in India. Challenges are:

- Transliteration service of the manuscripts which are metei script;

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- Established a separate repositories for manuscripts;
- Provide information to the scholars;
- Start awareness campaign to save the invaluable heritage;
- Promote the accessibility to the present and to succeeding generation;
- Provide a descriptive cataloguing by subject-wise and author-wise;
- Maintained conservation and preservation of existing manuscript wealth;
- Make them easily accessible through digitization and publication;

GENERAL FINDINGS

Preservation of knowledge has always been done by the private custodians and is a time-honoured task. The biographic detail of different subjects has been collected and the findings shows that the manuscripts in Manipur covers almost all the subjects like Administration, Arts and Culture, Astrology, Charms and Mantras, Creation, Lexicography, Fine arts, Earth science, Genealogy, Poetry, Prediction, Prose, Religion and Philosophy, Meitei scripts, Supernatural stories, Meitei confederacy to Family Genealogies. It also reveals the way how they organized and manage these valuable resources for future use. These materials are found to be very rare in nature and very fragile so it is necessary to organize and manage these invaluable resources. Everyday irreplaceable part of this memory disappears forever so now is the right time to think of how this can be preserved with care.

The law and order situation is only of the major concern which creates problems in the process of collecting data. Hesitation to disclose details about their collection by the custodians is also another problem. They need to be motivated in this regards. Accessibility to the contents of the resources is a big problem. In future research can be continued as a project to digitized their resources and make them available over internet to reach the needy scholars worldwide.

The resources available with the custodians are useful resources playing a vital role in preserving the rich cultural heritage of the past. Creating a database of these resources and making them accessible worldwide over internet is a major goal of research through which the later can submit enquiry about the accessibility to the contents of the resources. Otherwise huge precious resources will simply be lying unutilized.

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Electronic Resources Management: A Case Study of Strategic Planning at PEC University of Technology, Chandigarh

Seema Vasishta

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Sr. Librarian
PEC University of Technology
Chandigarh

Corresponding Author
Seema Vasishta
seema313@gmail.com

ABSTRACT

Electronic resources are the concept of new era, which have brought a lot of phenomenal changes in the process of information dissemination. One of significant challenge of new electronic environment is to manage the information and provide access to myriad forms of electronic resources. Present article presents a case study of strategic planning for managing electronic resources at PEC University of Technology. Besides giving a brief account of historical development of PEC University of Technology, the article provides an overview of how access to electronic resources is being provided at the PEC Library. It also shows how change from print-based resources to a hybrid (consisting of a mix of print and electronic) collection is being used for imparting information using technology as a catalyst.

Key Terms: Electronic Resources Management, Electronic Journals, DOAJ, BSU Journals in Chemistry, EEVL.

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INTRODUCTION

Present day libraries are connected to the world through wires and networks. Too much of information is available wrapped in different forms and formats. Not only the definition of resources embedding information has changed but also the concept of information retrieval has changed completely due to rapid and widespread developments in the technology. Earlier information resources were considered a physical entity but now these have evolved from traditional print documents to electronically stored information resources. In most simple words, it can be pondered that when we process data and convert it into meaningful and useful form, it becomes information and when this information is fetched via electronic infrastructure, this form is called as electronic resources.

Electronic resources are the concept of new era, which have brought a phenomenal change in the process of information dissemination. These are the information channels, available in remotely or closely located databases and can be accessed through interactive communication via computers and communication technologies. This form also includes those collections of the library having archival importance and converted to machine-readable format for preservation or to provide electronic access. These are not physical objects but a combination of text, animation, sounds, video clips, software applications and likes containing electronic machine readable information. Electronic resources are emerging as ubiquitous entities to access information distributed over networks of computers supporting full-text navigation and fast interaction.

TYPES OF ELECTRONIC RESOURCES

Various kinds of information resources are being generated electronic format and made available at users' desk to add a n dimension in the service aspect. Generally following types electronic resources are identified Singh et.al. (2007).

❑ Direct Access Resources

They are basic types of electronic resources and can be used any time. These have two sub-types.

■ Static e-resources

They contain fixed information and never change form databases available in CD form.

■ Dynamic e-resources

Such documents also contain fixed information, but information can change its outward form (multimedia CD-RO

❑ Remote Access Resources

These are the server and client based information resources called as remote access resources because the location of server is somewhere else. Such e-resources can be used by number of users at a same time. Information embedded in resources can change the electronic resources outw appearance and is updated regularly, so also called as livin documents.

Access to electronic resources is commonly available following categories:

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- **Subscribed Electronic Resources**

To access this category of electronic resources, some subscription amount/fee has to be paid to the publisher/owner.

- **Free Electronic Resources**

Such resources are freely available on the Internet and can be divide into sub-categories like:

Open Access journals/Free journals

Information available at Institutional Repositories

Organizational/Individual's websites

Individual Blogs/Professional Discussion Forums

Wikis etc.

PEC UNIVERSITY OF TECHNOLOGY: A SNAPSHOT

Institute Profile

The Punjab Engineering College, Chandigarh was originally established as Mugalpura Engineering College at Lahore (now in Pakistan) on November 9, 1921. The name of the college was later changed to Maclagan Engineering College and it started functioning under this name on March 19, 1924. In the year 1931, the college got affiliated to Punjab University, Lahore. In the year 1950, the word East was dropped and it came to be known by its present name-Punjab Engineering College. Towards the end of December 1953, the college shifted to its present campus in Chandigarh to function under Govt. of Punjab. In 1966, with the formation of Union Territory of Chandigarh, the college came under the control of the Govt. of India through the Chandigarh Administration. In October 2003, the Govt. of India notified the Punjab Engineering College as a Deemed to be University, Annual Report (2010). Recently in June, 2009 the name of the college has been changed to PEC University of Technology. PEC offers graduate, post-graduate and doctoral programs in nine branches of sciences and engineering and is at 19th rank amongst the top engineering institutions (both government and private) in India for the year 2010-11, Outlook India survey (2010).

Library Profile

With a collection of about 1,25,000 volumes in Science and Technology, PEC library is a domain for about 2000 information seekers; be it students, faculty or researchers pursuing studies in nine different branches of engineering. All the library activities are automated with the help of LibSys software. Books, bound volumes and Book bank books are all bar-coded. Library membership ID cards, issued to all the library members, are also bar-coded. It has adequate infrastructure to meet its requirement, has computerized all its operations and provides access to the collection through web-based Online Public Access Catalogue (OPAC). Besides comfortable seating and reading environment, the library has various facilities such as Multimedia Resource Centre, Study cubicles, Wi-Fi, Group Study Area, Private Study Area, Book bank facility, Library membership to Alumni and retired faculty etc. PEC library is rendering library services to its users since the time of its inception and continuously trying to adopt new technologies so as to promptly fulfill the users' demands.

MANAGEMENT OF E-RESOURCES

With the developments of digital technologies, the information demands of users are also getting changed with reference to format and speed to access the information. The mushrooming of information in electronic form has both complicated and transformed the acquisition and servicing of library materials. One of significant challenge of new electronic environment is to manage the information and provide access to electronic resources. The standards and strategies are required to access and organize the plenty of e-resources and to ensure free flow of information to the users. PEC library is striving to provide an effective combination of print, non-print and electronic resources for support of teaching, learning and research at the institute. This case study describes the journey of e-resources in PEC library.

Collection Development

Collection development being a planning function is carefully designed to formulate a comprehensive "Quality" development policy keeping in view present collection's strengths and weaknesses. For the PEC library, collection development policy has been developed to ensure that the criteria for selecting and the methods of accessing electronic resources are in line with the needs of the users. It has a very precise and documented purchase policy, where budget is also allocated for the subscription of electronic resources. The library works hand in hand with academic departments in making selections of various forms of electronic resources. Usually the recommendations to purchase e-resources are taken from the faculty of all the departments, perception being the proficiency of faculty in their respective subjects. Also suggestions from research scholars and other students are taken care of. However no de-selection policy for electronic resources has yet been formulized.

Growth of E-journals

Day by day, the quality and quantity of contents in electronic form in the libraries are increasing yet the major portion of electronic resources subscribed is formed by electronic journals. In March 2003, PEC library received a proposal from the Ministry of Human Resource Development (MHRD), Government of India to join the "Indian National Digital Library in Science and Technology (INDEST) Consortium". The later was initiated for "Consortia-based Subscription to Electronic Resources for Technical Education System in India", Arora (2003). The electronic journal service was introduced in the library in 2003, providing access electronic journals of five full-text databases including 3 from learned societies like ASCE (American Society of Civil Engineers), ASME (American Society of Mechanical Engineers), IEL (IEEE/IET Electronic Library), and two from commercial publishers which are Proquest and Springer link; through INDEST Consortium. Also access to one bibliographic database JET was provided. In the year 2008, PEC library arranged finances and looked to the INDEST consortium for support as it is the biggest consortium in terms of number of member institutions in Asia and so attracts the best possible price and terms of agreement from the publishers on the basis of strength of its present and prospective member institutions. Since the year 2008, PEC library started subscribing to three more commercial databases and provides electronic access to over one thousand journals published by learned societies as well as

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Table 1: Journals Accessible Electronically

S. No.	Database	URL	No. of Journals available
Commercial Publishers			
1.	ACM Digital Library	http://portal.acm.org/portal.cfm	32
2.	Science Direct	http://www.sciencedirect.com	225
3.	Springer Link	http://www.springerlink.com/	525
Learned Societies			
4.	ASCE Journals	http://www.pubs.ASCE.org/journals/jrns.htm/	30
5.	ASME Journals	http://www.ASME.org/pubs/journals/	21
6.	IEL Online	http://ieeexplore.ieee.org/Xplore/dynhome.jsp	219
		Total	1052

Access Management of E-Journals at PEC Library

At PEC users are provided with a secured and hassle-free log on procedure via IP (Internet Protocol) activation. The range of permitted IP addresses of the University is conveyed to publisher for activation. This type of access is very common and also more convenient for most of the users. This arrangement helps the user to access all the electronic resources immediately. This also keeps them free from memorizing user ID, Password, publishers URL etc. Access of different categories of electronic journal is being provided as under:

- **Individual Title Access**

A few publishers offer access to online versions of their journals along with print subscriptions on a complimentary basis. The library made use of this facility by registering such free online journals officially through the agents/vendors. Under this scheme, the PEC library gained access to 5 journals in 2007, and this rose to 11 in 2008 and 2009 and then to 15 online journals in the year 2010. This helps the user to have dual advantages of print as well as electronic journal and to develop a e-resources collection without much of budget constraints.

- **Consortium Access**

As already mentioned PEC library is member of INDEST consortium and having access to more than one thousand electronic journals.

- **Access to Electronic Journal in Public Domain**

In addition to above, PEC library provides links to electronic resources that are available in public domain free of cost and bringing this for the benefit of its users from its website. The library has identified some free technical online journals and provided access to such journals through the library webpage. Table 2 gives a list of sites having free access to journals of Engineering & Technology.

Table 2: List of Open Access Journals

Name of Database	URL
Directory of Open Access journals	http://www.doaj.org/ljbs?cpid=99
BSU Journals in Chemistry	http://www.chemistry.bsu.by/abc/current/fulltext.htm
EEVL(engineering, math and computer science)	http://www.eevl.ac.uk/

Expenditure Trends

As per purchase policy of PEC library, for the financial year 20 11, 20% of the budget allocated to each department must utilized for purchasing e-books as the library is lacking in e-bo collection. However for electronic journals library make ev effort to accommodate all the demands made by the faculty a research scholars and for that purpose additional demand for budget is made. As a policy the library has decided to drop print subscription of those resources which are available electronic form. A comparison of budget spent on print a electronic journals is given in table 3. In the financial year 20 08, the investment in electronic resources was nil but from year 2008-09, the investment increased vividly. Some of reason for this sudden increase is increase in student strength d to increase in seats; users are becoming more tech-savvy a quite used to searching the electronic information and there affordable decline in the cost of infrastructure related computers.

Table 3: Budget Comparison of Print and Electronic Journals

Year	Print Journals	Subscription Amount (In Rs.)	E-resources	Subscription Amount (In Rs.)
2006-07	106 (41- International 65- National)	15,18,730	More than 850 journals from 3 online databases	Nil
2007-08	90 (36- International, 54- National)	17,30,823	More than 900 journals from 3 online databases	Nil
2008-09	78 (28- International, 50- National)	13,37,309	More than 1000 journals from 5 online databases + One bibliographic database	11,53,1
2009-10	46 (18- International, 28- National)	9,47,961	More than 1000 journals from 5 online	9,68,0 database
2010-11	92 (38- International, 54- National)	19,00,000 (Proposed)	More than 1500 journals from 5 online	21,00,0 (Propose database

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Organization of Electronic Journals

Organization involves the presentation, storage of electronic resources and access to it. Users are to be made aware of all the electronic resources available in the library. Dissemination of acquired electronic journals may be done through different mechanism such as the library catalogue, library WebPages or by using commercially available electronic journal management software. At PEC, access to electronic journals is being provided both through OPAC as well as Website.

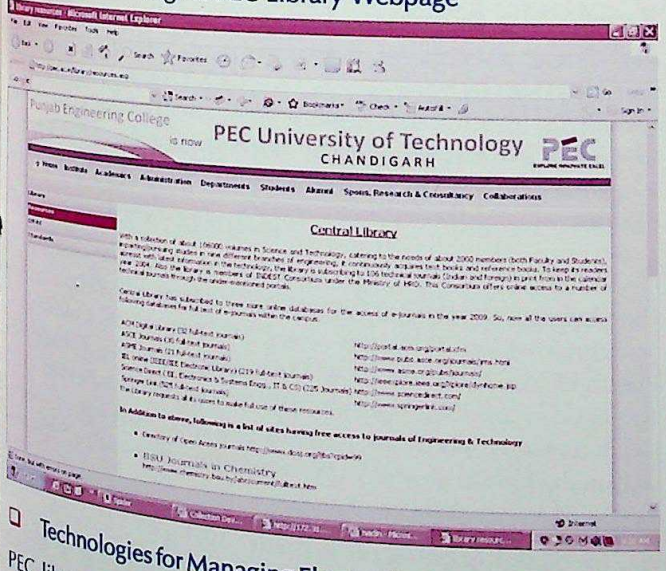
- **OPAC**

The URL of individual titles is integrated with the OPAC so that users can be able to access the electronic journals through it.

- **Website**

Library websites have emerged as a proactive and service-oriented medium for dissemination of electronic journals wherein providing comprehensive bibliographic access to all electronic journals. It is very easy for user to have access to all the electronic journals if library is consolidating their access on a single platform which is website. In 2006, a web page, http://pec.ac.in/library/Library.asp, dedicated to library was created in the PEC website providing hyperlinks to the site addresses/URLs of subscribed online journals from various publishers with a view to provide prompt access to the electronic journals with a couple of mouse clicks. The library website, written on HTML and JavaScript, is an integral part of the Institute's Intranet and Internet Homepage. This webpage provides the basic information about the activities of the library, its collections and links to its OPAC (Intranet only) and other associated services. A screenshot of the webpage of PEC library is given in fig.1.

Fig. 1: PEC Library Webpage



Technologies for Managing Electronic Resources

PEC library is amalgamating novel technologies for providing prompt access to the electronic resources.

- **Computing Infrastructure**

Long range planning and sourcing of the appropriate IT and Communication infrastructure conducive for proper delivery of electronic resources is pre-requisite for every participating library. PEC library is equipped with the following infrastructure of computers, peripherals and network facilities for properly accessing the electronic resources.

Table 4: List of Computers and Peripherals

Make & Model	Qty.	Purpose
Server		
ACER server	1	Internet access
Desktops		
HCL computers	7	For library work
HCL computers	2	For OPAC
Peripherals		
Dot matrix printer	1	For office work
DVD writer	1	For data backup
Hard drive external	1	For data backup
Bar code scanner	1	For scanning barcodes
HP LaserJet printer	1	For Sr. Librarian I/C
HP LaserJet printer	1	For barcode printing
Other hardware		
ADSL router dwl-p-50	2	For wi-fi
Ethernet switch 24 ports	1	For networking

- **Wireless Environment**

PEC has made liberal use of wireless technology to make the users able to connect to the network from a laptop computer without 'plugging in' at some areas called 'hot spots'. These areas use wireless fidelity or 'wi-fi' where users whose electronic devices have wireless capabilities can catch a wireless signal to access the electronic resources. As the PEC campus is wi-fi enabled, students & faculty can access Internet services in their departments as well as hostels round the clock.

Multimedia Resource Centre

PEC library is developing as a hybrid library as it is exploring computer & allied advances for better and fruitful delivery of information embedded in electronic resources. It is having multimedia resource centre to make use of popular mode of education i.e. electronic media with the following equipments and collections.

Table 5: List of Multimedia Equipments

Name of Equipment	Quantity
LCD projector	1
Overhead projector	1
VCR	2
Slide projector	1
Television	3

- **CD-ROM Collection**

With the developments in CD technology, many electronic databases (both bibliographical and full-text) and

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educational media packages digitized on CD/DVD and the later are highly used as portable information resources. Also some contemporary books contain CDs for providing additional information to supplement the text present in the book. All such material is accessioned and made available for use of the library users. PEC library has a good collection of electronic learning material in form of 842 CDs/DVDs and 113 floppies.

- **Video Viewing Facility**

Library has a high-quality collection of video recording (581 no.) of a series of class room lectures delivered by faculty of prestigious technical institutes of India like IITs to undergraduate students. The multimedia centre has equipments like TV and VCR for viewing these video lectures. This facility can be availed during all working days of the library. PEC library is planning to screen the VCDs/DVDs for couple of hours daily in Multimedia Resource Centre so as to attract the user community.

- **LAN Based Search of Indian Standards**

The Library has complete collection of Indian Standards on Intranet and is available for viewing within campus on LAN network.

Library Staff Training

Human resources are the key to the successful use of any organization. The involvement of the library staff is essential for effective use of resources accessible electronically. Training programmes act as a bridge to facilitate communication amongst staff and find answers to common problems. PEC library has a good team of 3 professionals, 2 semi-professionals, 2 data entry operators and 15 support staff members who are committed to their work. In order to sustain and enhance their motivation and to upgrade their knowledge and skills, professional staff members at PEC Library are regularly deputed to various training courses, conferences organized in different parts of the country, which has enabled them to provide qualitative services to their users. The idea is to 'Train-the-Trainer' to facilitate the users to make maximum use of the resources available in electronic form. A brief description of the journal publications and training attended is given below.

Table 6: Training of Library Staff (2006 to 2010)

Designation	Publications	Workshop/ Conference attended
Sr. Librarian I	2 (International) 14 (National)	14
Sr. Librarian II	1 (National)	5

User Education & Promotional activities

Keeping users informed of the electronic resources is a big challenge. When a sophisticated service in the form of electronic journals is introduced, promotion is the only factor which determines the effective use of the service. Users are to be made aware of all the electronic journals available in their field of interest. Apart from being a promotional medium, a library's website plays an important role in maximizing access to electronic journals. Library users who need assistance in accessing the e-resources, online databases, online-journals and online library catalogue (OPAC) etc. are provided the individual training at the multimedia resources centre, which facilitates effective utilization of the e-resources.

BARRIERS IN PROCUREMENT OF E- RESOURCES

Present scenario is witnessing the increasing popularity of electronic resources yet the environment is not free of challenges. Following are the some of the challenges PEC Library is facing in developing electronic resources collection and providing them to the user community.

Sustainability

Lack of permanent archive is a major concern for PEC library as always wanted to provide perpetual access to subscribed electronic journals. Access after cancellation of subscription of electronic journal is a big issue for maintaining back files of the collection.

Frustrating Interfaces

Sometimes the publishers' interfaces, providing access to electronic resources, are so frustrating as a lot of time is spent clicking the mouse umpteen times to have access to full-text electronic journal contents. A lot of users' precious time is wasted in doing this exercise.

Maintenance

Electronic resources provide many facilities but it requires technically expert staff to maintain e-journal finders, records, OPAC etc. As PEC library has started developing the collections of electronic resources, all the records are to be maintained both in paper form as well as in electronic form.

24x7x365 Access

In contrast to the concept of omnipresence of electronic journals the fact is that electronic journals can be accessed only within the campus of the institution subscribing to the services of the electronic journals. PEC library is yet to manage the access of electronic journals to its users outside the four walls of the campus.

Technical Skill of User

Developing a collection of electronic journals calls for computer and information literature users. Unlike print collections, librarians must ensure that their users are technologically equipped to use electronic journals. For effective exploitation of the potential of electronic journals, the user must not be aware only of the format in which the information is available, but also be able to access that format properly.

Promotion of Electronic Journals

Keeping users informed of the electronic journal is a big challenge. When a sophisticated service in the form of electronic journals is introduced, promotion is the only factor which determines the effective use of the service.

Perpetuity of Archive

Electronic formats are immensely dependant upon various kinds of software and hardware, which are transient in nature.

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nobody is convinced about the enduring access to electronic version of the documents.

ROADMAP FOR FUTURE

Change being the only constant, PEC Library would endeavor to meet the potential demands of the users by bringing in further improvements. The following are a few improvements that are under consideration:

- **Subject Access to Electronic Journal Collection**

Library is planning to have a comprehensive database of each electronic journal title for all publishers including all the appropriate metadata sets like title, homepage URL and subject for each journal title. Also each journal title will be linked directly to its home web page.

- **Online Help Module**

Aim of this service will be to provide instructions to users on how to use the electronic journal service. The instructions will be included on how to perform search or browse the journal titles; how to print or save a particular article.

- **Network-Based CD-ROM Search Services**

PEC library is having vast collection static electronic media in form of educational CDs, DVDs etc. It is under process to procure a CD/DVD server so as to host all the CDs systematically on the server and made available on intranet.

- **Electronic SDI**

Library is planning to create individualized virtual journals to help the researcher stay current with their area of interest (electronic form of SDI). Such process draws attention of tech-savvy user.

- **Institutional Database**

An Institutional Repository (IR) consists of formally organized and managed collection of digital content generated by faculty, staff and students at an institution or university. To develop this endeavor, PEC library is making efforts to convince the faculty members and research scholars to deposit papers in the digital archive, thereby revealing the prestige of PEC as institution.

- **Structured User Education**

User Education helps in extensive use of library resources and services. The library is planning to organize structures user education programme (SUEP) for new undergraduate and post graduate students with help of faculty. This will include power point presentations about library facilities, resources and services. Also printed handout will be delivered in the classrooms.

CONCLUSION

The information landscape is changing swiftly with the progression in technology and prolific growth of electronic resources. Electronic resources promote and advance teaching and learning and also facilitates improved productivity and qualitative research. Electronic resources are being added to library collection at exponential rates. The major challenge for library managers is to manage them efficiently so as top provide the users with convenient ways to find and access them. Policies that can effectively address electronic resources management have to be developed meticulously as the later can generate satisfaction among users community and also ensure excellence in collections and services. From this profile, one can try to be acquainted with which pitfalls to fill and what paths to follow as There is indispensable need to develop a suitable and effective model for electronic resources management and to provide better library services to endow users with a virtuous cycle of opportunities. Such library will have no limits other than the frontiers of the world itself. The bottom line is the pinnacle of success of libraries depends upon the effective utilization of electronic resources, which will in turn give a new face-lift to transform them to information centres.

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Use of Information Resources and Services at Punjabi University Extension Library, Mohali

Gurjeet Kaur Rattan* and Saroj Bala**

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*Assistant Librarian
Punjabi University Extension Library,
Mohali
** Librarian
Punjabi University
Patiala

Corresponding Author
Gurjeet Kaur Rattan
gurjeetkaurrattan@yahoo.in

ABSTRACT

This paper presents a survey regarding the use of information resources and services at Punjabi University Extension Library Mohali. The number of users surveyed was 80 comprising of 60 males and 20 females. The results showed that maximum users were of above 60 years age group. The purpose of visiting 42.5% users was to read newspaper/magazines only. 41.25% users visited the library twice a week. The three fourth users were satisfied with the reading material and 80% users were not using library catalogue at all. Users were generally satisfied with the physical facilities as well as services offered to them by the staff of the library. This paper also discusses a few suggestions to make the services more beneficial for the community at large.

Key Terms: Public library, Physical Facilities, PUDA, Extension Library Mohali.

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INTRODUCTION

Libraries are considered as repositories of human experience and knowledge. Although libraries have changed significantly over time but these are still responsible for acquiring and providing access to books, periodicals, newspapers etc. that meet the educational, cultural, recreational and informational needs of the users. Public libraries are world-wide phenomenon and exist in different societies, cultures at different stages of development. Public libraries provide different type of services and the way those services are delivered at different stages of development. Although public libraries operate in varied context but they have some commonalities in shared characteristics.

The users of public libraries consist of every category of people of society making the public libraries important in every sphere of societal development. Public libraries have been defined in various ways as follows:

Gates (1976) defines a public library as "that authorized by law, supported from general public funds or special taxes voted for the purpose of administration, for the benefit of the citizens of country, town, city or region which maintains it on the basis of equal access to all".

According to the IFLA/UNESCO Public Library Manifesto (1994), public library is the local gateway to knowledge, provides a basic condition for life-long learning, independent decision-making and cultural development of the individual and social groups.

According to Lawal et.al. (1994), the library meets the information needs of the users in the following four categories:

- **Education:** To develop society, adults, children and fill gaps in memory.
- **Information:** To develop executive activities such economics, social and commercial development.
- **Aesthetic:** To cultivate appreciation for culture, art, tr and judgment.
- **Recreation:** To provide amusement and hobbies.

From the above definitions, a Public Library can be explained a place built for the collection of books and other printed resour as required to meet the information, research, education recreational, cultural and aesthetic needs of the varied users a is usually financed with public funds.

Punjabi University Extension Library, Mohali (ELM) is a public well academic library and came into existence in 1996 with joint efforts of PUDA (Punjab Urban Development Authority) a Punjabi University, Patiala. Although it was established to se the local masses of Mohali but it also caters to the needs of students as well as faculty members of Regional Centre Moh (RCM). This library is a boon for public as well as academicia On one hand the rich collection of this library helps in research work, entertainment and general awareness of public, on the other hand students and faculty members of R and other colleges also come to refer this library.

LITERATURE REVIEW

Use of public Libraries in different states in India has been studi extensively.

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Chopra et.al. (2005) conducted the study related to utilization of library and information services of public libraries in Punjab. He obtained data about the usage of the public library services by different age group of users and users from different level of qualification. He identified their needs and assessed the quality of library services provided by the public libraries in the state of Punjab. The author highlighted that the usage of public library services by the female users was significantly low and needed serious attention by the library authorities of the state.

Parvathamma et.al. (2009) carried out a survey on use of information resources and services in the public libraries of Bidar District Karnataka, India and showed that a majority of readers were men between group of 11-30 years and they included students, unemployed youth or employees in private sector, belonging to lower or middle income group. They spend less than one hour in the library and inconvenient timing was the main reason for not visiting the library more frequently. Books and magazines, friends/teachers, radio/television was the information channels most frequently used to satisfy their information needs. Newspapers and magazines were the most frequently read information resources and fiction was the most frequently borrowed documents. Reading room and the book lending services were the most frequently used services. Concluded that since most of the users were students and unemployed youth, public libraries need to enrich their information resource collection, provide access to internet and offer community-based services, including literacy programmes. Public libraries need to take proactive approach in motivating users to use these resources and services to enhance their competence level.

Tyagi (2011) sought to determine the use of Information Resources and Services at Delhi Public Library, Delhi. His study demonstrated and elaborated the various aspects of use of information resources and services, physical facilities available and collection of DPL. He identified the levels of use of various services provided, problem faced by the users and satisfaction level of users with central library collection. Suggestions were given to make the services more beneficial for the academic community of the mentioned library.

OBJECTIVES

The objectives of the current study are as follows:

- To find gender of users of ELM
- To ascertain age group of users
- To know the purpose of visiting the library
- To find out the frequency of visits of users to the library
- To know the type and status of reading material used
- To know usage of library catalogue
- To know the user's satisfaction about the physical facilities, library material as well as services

METHODOLOGY AND SAMPLE

Questionnaire and personal interview methods were used to collect data for the analysis purpose of ELM. The concern of the study was that survey data might further be used for improving the usability of resources as well as services of the library. Although it is a public cum academic library, the present study has been limited to the response of the public users only. It has registered as well as non-registered members. At present, the library has a registered membership of 70 users. The number of daily users is observed to be between 30 and 80 on any working day including the visits of 5 to 10 registered members. As the library also maintains a visitors' register to monitor the visits of registered as well as non-registered members, it is observed that total number of visitors to the library may be approximately 125 to 140. It may be mentioned here that the observation has revealed that almost one third visitors are students, another one third are employees and the rest are the general readers as well as children. A total of 90 questionnaires were administered and 80 filled in questionnaire were obtained from the public users (registered as well as non-registered). The main objective of the survey was to include all public users of the library.

RESULTS AND ANALYSES

An attempt has been made to interpret and analyse the use of information resources and services at Punjabi University Extension Library Mohali. Questionnaires were distributed among the public users of the library and were asked to go through each set of questions. The users were expected to answer each and every question along with opinion towards the same.

❑ Gender of Users

The gender of the users is presented by table 1 and it is clear from this table that ELM is dominated by male users as 80% readers are male and only 20% users are female.

Table 1: Gender of Users

S. No	Gender	%age
1	Male	64(80)
2	Female	16(20)

❑ Age of Users

It is evident from table 2 that users of all age groups visit the library. Most of the users visiting the library are of above 60 years age group. There is equal number of users of 16-30 and 46-60 age groups visiting the library. Again users up to 15 and 31-45 age groups are equal in number.

Table 2: Age of Users

Age in years	Response	%age
Up to 15	14	17.5
16-30	16	20
31-45	14	17.5
46-60	16	20
Above 60	20	25

❑ Purpose of Library Visit

It is apparent from the table 3 that maximum users visit the library to read newspaper/magazines followed by the users who read

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books only. The users visiting the library to read books as well as newspapers/magazines are 15% whereas 8.75% users visit the library to prepare for competitive examinations. Only a small number of users visit the library both for newspaper/magazines reading and preparing for competitive examinations.

Table 3: Purpose of Library Visit

Purpose of Library Visit	Response	%age
To read books only	24	30
To read newspapers/magazines only	34	42.5
To read books and newspapers/ magazines	12	15
To prepare for competitive exams only	7	8.75
To read newspaper/magazines as well as preparing for competitive examinations	3	3.75

Frequency of Visits

It is clear from table 4 that more than one fourth users visit the library every day. It is observed that 41.25% users visit the library twice a week. The frequency of users visiting the library decreases gradually as the frequency of visits decreases from once a week to rarely visits.

Table 4: Frequency of Visits

Frequency	Response	%age
Once a day	22	27.5
Twice a Week	33	41.25
Once a Week	9	11.25
Once Fortnightly	7	8.75
Once in a Month	5	6.25
Rarely	4	5

Material Used by Users

ELM has books on various subjects along with 19 newspapers and 33 magazines. Newspaper/Magazines are maximum (33.75%) used reading material by users followed by general books (27.5%), newspaper clippings (16.25%), reference books (15%) and subject books (7.5%). Reading material used by users is depicted by table 5 given below.

Table 5: Material Used by Users

Resources	Response	%age
General Books	22	27.5
Newspapers/Magazines	27	33.75
Newspaper clippings	13	16.25
Subject Books	6	7.5
Reference Books	12	15

Status of Reading Material

Status of reading material is depicted by table 6. This library has rich collection on religious and literary books. As most of the users visit the library to read newspaper/magazines, religious and literary books, they are satisfied with the status of the reading material. However, one fourth users feel that reading material is not adequate as most of the latest books are not available in the library.

Table 6: Status of Reading Material

Adequate Reading Material	Response	%age
Yes	60	75
No	20	25

Library Catalogue

Only 20% users use library catalogue and rest do not use it at all.

Table 7: Use of Library Catalogue

Use of Library Catalogue	Response	%age
Yes	16	20
No	64	80

Reasons For Not Using The Catalogue

The users were also asked to give reasons for not using the library catalogue. Majority of the users responded that they visit the library to read newspaper/magazines only so they do not require it at all. 21.88% users say whenever they require a book, staff provides it to them, 9.37% users say usage of library catalogue consumes much time and rest say guides are there on the stands for books required by them and users do not know how to use the library catalogue.

Table 8: Reasons For Not Using The Library Catalogue

Reasons	Response	%age
Consumed Much Time	6	9.37
Do not Know how to Use Catalogue	5	7.81
Guides	5	7.81
Personal Assistance Provided by Staff	14	21.88
Do not Require	34	53.13
Total	64	

Physical Facilities

It is apparent from table 9 that users are generally satisfied with working hours of the library and only a fraction of users are satisfied. Half of the users are satisfied with the reading facilities and rest half is not satisfied. Most of the users are satisfied with the general facilities like air, water and lighting.

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Table 9: Satisfaction Level of Physical Facilities

Facilities	Yes(%age)	No(%age)
Working Hours	71(88.75)	9(11.25)
Reading Room Facilities	40(50)	40(50)
Environment	54(67.5)	26(32.5)
General Facilities (Air, Water, Lighting)	73(91.25)	7(8.75)

User Satisfaction with Library Services

Table 10 depicts the satisfaction of users about the library services. It is clear from this table that 50% users were satisfied with the library services, followed by 40% users fully satisfied, 7.5% users somewhat satisfied and 2.5% users not satisfied at all.

Table 10: User Satisfaction

Satisfaction Level with the Library Services	Response	%age
Not Satisfied	2	2.5
Somewhat satisfied	6	7.5
Satisfied	40	50
Fully satisfied	32	40

RECOMMENDATIONS AND CONCLUSION

Keeping in view the above results, the following suggestions are made to improve the library services as well as usage of resources:

- Efforts should be made to increase the number of female users.
- As most of the users visit the library to read newspapers/magazines only; they should be encouraged to use other library resources also.
- The users who visit the library rarely or who are not regular users, efforts should be made to convert them into regular users.
- Latest books on all subjects along with general books should be added to the library collection so that readers can use the library material optimally. E-resources should also be added to the library collection.
- More lights and fans should be installed. A reprographic machine should also be installed at the library premises so that readers need not to go outside the library premises to get the required document Photocopied.
- Library should also remain open on Sundays so that users, who cannot visit the library on working days, can visit it on Sundays.
- As far as usage of library catalogue is concerned, more and more users should be encouraged to use it.
- There should be more space for the readers to make environment more conducive to reading. There should be separate reading room for residents of Mohali, especially for students where they can come and bring their personal books to read.

In the end, it can be concluded from the above discussion that ELM provides equal access to knowledge, information and works of the imagination through a range of resources and services to its users. It provides access to members of the community regardless of race, nationality, age, gender, religion, language, disability, economic and employment status and educational attainment.

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Exploring the Information Seeking Behavior of Medical Science Professionals: A Case Study of Veer Surendra Sai Medical College, Burla, Odisha

Rabindra K. Maharana*, Amulya Prasad Dhal** and Subrat Pati***

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*National Institute of Science Education & Research (NISER), Bhubaneswar
** Asst. Librarian
C.V. Raman College of Engineering, Mahura, Bhubaneswar
*** Sr. Librarian
Rajdhani Engineering College, Rasulgarh, Bhubaneswar

Corresponding Author
Rabindra K. Maharana
maharana.rabindra@gmail.com

ABSTRACT

The present study investigates information seeking behavior and satisfaction level of the faculty members and students at the VSS Medical Collge, Burala, Odisha. For the purpose of the present study a structured questionnaire covering most relevant aspect of the study were distributed among 187 faculty members and 143 students, out of which 113 questionnaires from faculty members and 108 questionnaires from students were returned. The collected data were tabulated in MS-Excel in a logical order and statistical techniques such as mean deviation and standard deviation applied where ever necessary. The study also examines frequency of library visit, purpose of information seeking, preferred resources, most preferred search engine, satisfaction level among the respondents etc.

Key terms: Information Seeking Behavior, Mean Deviation, Online Sources, Altavista, MSN, Hot Bot.

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INTRODUCTION

Information seeking behavior is a complex activity, requiring access to diverse information resources to deal with work-related, personal, and social information problems. It refers to strategies for locating information, and it has basically three elements: people, information and systems. The study of individual information seeking behaviour requires understanding of the psychological state of the user that may lead to insight into their expectations make it possible to predict information seeking activity, Ocholla (1999).

With the deluge of available information, each person needs information of increasing variety. The information needs of a particular group of users and for a specific situation or organization are difficult to determine. There is not one simple system to cope up with all information needs, (Mahapatra et.al. (2001). According to Krikelas, information-seeking behaviour refers to "any activity of an individual that is undertaken to identify a message that satisfies a perceived need", Krikelas (1983). Information- seeking behaviour is expressed in various forms, from reading printed material to research and experimentation. Information users make active and intentional attempts to seek up-to-date information from the library resources, including electronic sources, Leckie et.al. (1996).

VEER SURENDRA SAI MEDICAL COLLEGE: AT A GLANCE

The Veer Surendra Sai (VSS) Medical College and Hospital has been in operation since 1959 in Burla, Sambalpur, Orissa. It offe undergraduate and postgraduate education in medicine a surgery, besides offering training courses in pharmacy a nursing. Students can opt for para- medical and medical cour leading to undergraduate and postgraduate degrees. Apart fr theoretical education, students are also given enough scope continuing their research studies and practical training.

VSS offers both undergraduate and postgraduate programs medical science (MBBS, MS, MD) and other paramedical deg including nursing (GNM). VSS Medical College is recogniz regulated and monitored by the Medical Council of India.

REVIEW OF LITERATURE

Shokeen & Kushik report on a study about information seek behaviour of social scientists in the universities of Haryana. T study showed that most of the social scientists visit the libr daily. The preferred search tools were indexing and abstract periodicals and citations in articles. Current journals and boo were preferred sources of information, Shokeen (20 Information-seeking behaviour of faculty members fr Government Arts Colleges in Cuddalore District was studied Suriya, Sangeetha, and Nambi to evaluate information-seek pattern of faculty members in the library. Most of the respond visited the library several times a week to meet their informa needs, Suriya et.al. (2004).

In Pakistan, the evaluation of information needs and informati seeking behaviour has gained interest during the last

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decades. Anwar (2007) reports on different research studies of different groups of people in Pakistan. Bhatti (2008) carried out a survey on student needs in the Islamia University of Bahawalpur. Shahzad (2007) conducted a survey to find out the information-seeking behavior of faculty members from all three faculties, i.e., science and technology, social sciences, and humanities of Government College University, Lahore.

OBJECTIVES

The followings are the basic objectives of the present study:

- To find out the awareness and use of library resources by the students and faculty members.
- To find out the type of information sources used by the students and faculty members.
- To find out the purpose of seeking information.

METHODOLOGY

To fulfill the objectives of the present study, a structured questionnaire covering the relevant aspect of the study were distributed among the faculty members and students of VSS Medical College. Though it is not possible to cover all the faculty members and students of the college due to their day to day busy schedule, thus, random sampling technique was used for distribution of questionnaire as it was not possible to collect data from all the target respondents. The questionnaires were distributed to the faculty members who were present at their concerned departments and students who were present in their library, class rooms and hostels. Besides, in some case personal interaction and verification of library and other relevant records related to the study were made to get first hand information on the topic. Over all 330 questionnaires were distributed among the faculty members and students and 221 filled in all aspect questionnaires were returned by the respondents with the response rate of being 66.97%. The collected data were analyzed, classified and tabulated by employing statistical techniques such as percentage, arithmetic mean, mean deviation and standard deviation etc. The mean and standard deviation are calculated to ascertain the level of variations amongst the variables by using the following formula:

Mean Deviation (δ) = $x - X$

Where, x= number of response

X= number of responses

Standard Deviation (σ) = $\sqrt{\Sigma (x - X)^2}$

N Where, $\Sigma (x - X)^2$ = sum of the squares of mean deviation

ANALYSIS AND DISCUSSION

Classified Data on Respondents

The attitude and use of library resources of users varies from one another. Realizing the importance of this, the respondents of the present study have been grouped into two categories, vise, faculty members (which includes Prof., Asst. Prof., Sr. Reader, Tutor, Junior Resident etc.) and students (which includes the post graduate and undergraduate students of VSS Medical College) for the convenience of the present study. The detailed classified data on respondents are shown in Table-1 as follows.

Table 1: Classified Data on Respondents

Category	Questionnaire Distributed	Questionnaire Received
Faculty Members	187	113
Students	143	108
Total	330	221

Use of Information Channels

Respondents were asked to indicate the most preferred information channel which they consult first for their information needs. The collected data are analyzed in table 2 which shows Internet/ online sources of materials is the most convenient channel among both categories of respondents i.e. 91.15% and 90.74% respectively. Besides that most of the faculties consult their personal collection as their first preference with having a response rate of 85.84% followed by book stores 60.18%, library 53.58%, friends/ colleagues 48.67% and only 25.66% prefer any other channels. Similarly, among the students responses library is the first preference with having response rate of 86.11% followed by 52.78% (personal collection), 49.07 % (friends/colleagues), 44.44 % (book stores) and only 34.26 % prefers to consult any other channels of information.

Table 2: Use of Information Channels

Information Channel	FacultyMembers		Students	
	Response	Deviation	Response	Deviation
Library	61 (53.98)	-7.83	93 (86.11)	28.67
Personal Collection	97 (85.84)	28.17	57 (52.78)	-7.33
Book Stores	68 (60.18)	-0.83	48 (44.44)	-16.33
Friends/ Colleagues	55 (48.67)	-13.83	53 (49.07)	-11.33
Internet/ Online	103 (91.15)	34.17	98 (90.74)	33.67
Any other	29 (25.66)	-39.83	37 (34.26)	-27.33

For Students	for Faculties
X_1 =68.83	X_2 = 64.33
σ_1 =10.27	σ_2 = 9.36

Frequency of Visit to the Library

The frequency of library visit has been classified into five time gap as shown in table-3 which shows majority of the 91 respondents (41.18%) visits once in a week to the library followed by 81 respondents (36.65%) visits when they feel the necessity, 31 respondents (14.03%) twice in a week, 13 respondents (5.88%) thrice in a week and only 5 respondents (2.26%) visits almost daily to the library.

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Table 3: Frequency of Visit to the Library

Respondents	Almost Daily	Thrice in a Week	Twice in a Week	Once in a Week	When Feel	Total Responden
Faculty	--	2 (1.77)	8 (7.08)	39 (34.51)	64 (56.64)	113 (100
Students	5 (4.63)	11 (10.18)	23 (21.3)	52 (48.15)	17 (15.74)	108 (100
Total	5 (2.26)	13 (5.88)	31 (14.03)	91 (41.18)	81 (36.65)	221 (100

Purpose of Seeking Information

Table 4 shows regarding the purpose of seeking information the faculties are mostly seeking for publication with having a response rate of 77.88% followed by 73.45% for research, 53.1% for study/ preparing lectures, 46.9% for self improvement and 39.82% are seeking for other purposes. Similarly, 100% stud are seeking for study followed by 93.52% for research, 81. for self improvement, 69.44% for publication and 51.85% other purposes.

Table 4: Purpose of Seeking Information

Purpose	Faculty Members		Students	
	Response	Deviation	Response	Deviation
Study/ Preparing Lectures	60 (53.1)	-5.8	108 (100)	22.4
Research	83 (73.45)	17.2	101 (93.52)	15.4
Publication	88 (77.88)	22.2	75 (69.44)	-10.6
Self improvement	53 (46.9)	-12.8	88 (81.48)	2.4
Any other	45 (39.82)	-20.8	56 (51.85)	-29.6

For Students **For Faculties**

X_1=65.8 X_2= 85.6

σ_1=16.85 σ_2 = 18.62

Resources for Use

The respondents were asked to mention the sources which they are using for their information needs. Table 5 gives a clear picture that internet is the most conversant resources among all categories of respondents with having a response rate of 87.6 and 90.74% respectively. Besides that faculties are mostly u research articles (82.3 %) followed by dictionary/ encyclope (69.03%), pamphlets (61.95%), textbooks (57.22%) and 53. uses any other resources to meet their day to day n respectively. Similarly, besides internet textbooks are mostly u resources among the student respondents with having a respo rate of 83.33%, followed by 76.85% research articles, 71. pamphlets, 70.37% dictionary/ encyclopedia and 50.93% other resources respectively.

Table 5: Resources for Use

Information Sources	Faculty members			Students		
	Response	%	Deviations	Response	%	Deviations
Textbooks	65	(57.52)	-12.5	90	(83.33)	10.17
Research Articles	93	(82.3)	15.5	83	(76.85)	3.17
Internet	99	(87.61)	21.5	98	(90.74)	18.17
Pamphlets	70	(61.95)	-7.5	77	(71.3)	-2.83
Dictionary/ Encyclopedia	78	(69.03)	0.5	76	(70.37)	-3.83
Any other	60	(53.1)	-17.5	55	(50.93)	-24.83

For Students **For Faculties**

X_1=77.5 X_2= 79.83

σ_1 =14.27 σ_2 = 13.43

Online Resources

Table 6 shows the respondents use of various online resources, which, shows 103 (91.15%) faculty members uses online databases on their concerned subjects followed by 93 (82.3%) multimedia collection, 90 (79.65%) uses CD-R databases & products, 82 (72.57%) uses OPAC and 71 (62.8 uses other online sources respectively. Similarly, OPAC (89.8 is the most widely used online resources among the stud respondents followed by CD-ROM databases (79.63%), o databases (73.15%), multimedia (69.44%) and other (55.5 respectively.

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Table 6: Online Resources

Online Sources	Faculty Members		Students	
	Response	Deviation	Response	Deviation
OPAC	82 (72.57)	-5.8	97 (89.81)	17.6
CD- ROM databases & products	90 (79.65)	2.2	86 (79.63)	6.6
Online databases	103 (91.15)	15.2	79 (73.15)	-0.4
Multi media collection	93 (82.3)	5.2	75 (69.44)	-4.4
Any other	71 (62.83)	-16.8	60 (55.55)	-19.4

For Students **For Faculties**

X_1=87.8 X_2= 79.4

σ_1=10.76 σ_2 = 12.24

- **Preferred Search Engines**

Regarding the preferred search engine Google is seen as the most popular search engine among all the categories of users having a response rate of 100%. Besides Google, MSN (92.04%), Yahoo (87.61%), Altavista (79.65%), Hot Bot (53.58%) and 29.2% other search engineers are most preferred among the faculty members. Similarly, Yahoo (93.52%), MSN (86.11%), AltaVista (80.55%), Hot Bot (67.59%) and other (61.11%) among student category respectively.

Table 7: Preferred Search Engine

Search Engine	Faculty Members			Students		
	Response	%age	Deviation	Response	%age	Deviation
Google	113	(100)	29.67	108	(100)	20
Yahoo	99	(87.61)	15.67	101	(93.52)	13
MSN	104	(92.04)	20.67	93	(86.11)	5
Altavista	90	(79.65)	6.67	87	(80.55)	-1
Hot Bot	61	(53.98)	-22.33	73	(67.59)	-15
Other	33	(29.2)	-50.33	66	(61.11)	-22

For Students **For Faculties**

X_1=83.33 X_2= 88

σ_1=27.78 σ_2 = 17.74

- **Level of Satisfaction to Access Library**

Respondents were asked to provide their remarks to provide their overall assessment of the effectiveness of VSS Medical college library in meeting their information needs which is listed in table 8. Further, it shows 83 (37.56%) respondents were moderately satisfied followed by 73 (33.03%) satisfied, 41 (18.55%) dissatisfied, 20 (9.05%) highly satisfied and 4 (1.81%) highly dissatisfied respectively.

Table 8: Level of Satisfaction to Access Library

Level of Satisfaction	Highly Satisfied	Satisfied	Moderately Satisfied	Dissatisfied	Highly Dissatisfied	Total
Faculty Members	6 (5.31)	20 (17.7)	52 (46.02)	31 (27.43)	4 (3.54)	113 (100)
Students	14 (12.97)	53 (49.07)	31 (28.7)	10 (9.26)	--	108 (100)
Total	20 (9.05)	73 (33.03)	83 (37.56)	41 (18.55)	4 (1.81)	221 (100)

FINDINGS AND CONCLUSION

- Internet/online sources are the most convenient channel to collect the required information needsx among the faculty members and students of VSS Medical College.
- Most of the researchers visit the library once in a week.
- Most of the faculty members are seeking information for publications while all the students basically for their study.

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- Internet is the most familiar resource for use among the respondents community. Further, among online resources online databases and OPAC are the most in use.
- Google is the most popular and preferred search engine among the respondents community.
- Most of the respondents are moderately satisfied with the library services.

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Information Seeking Behaviour and Use Pattern of Faculty Members of V.L.B Group of Institutions: A Study

S. Jeya Prakash*, K. Rajesh Kuriakose** and P.J. Nirmala***

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* *Librarian*
V.L.B. Janakiammal College of Art & Science, Coimbatore
** *Librarian*
Kerala school of Mathematics, Kizhikode
*** *Senior Librarian*
Karunya University, Coimbatore

Corresponding Author
S. Jeya Prakash
jey_prakash@hotmail.com

ABSTRACT

The concept of information remains vague, it can be perceived as something between data, knowledge which is communicated or received concerning a particular fact of circumstance in order to reduce the user's uncertainty by meeting their needs. To create information awareness and to promote the use of information, it is necessary to know the needs of the users. The present age of information explosion has resulted in an escalating growth of information need of users has become varied and multidimensional. This paper examines the information seeking behavior and use pattern of faculty members of V.L.B Group of institutions. This study examines several aspects of library use, time spent by the faculty, huddles in information seeking behavior, methods adopted by faculty for seeking information etc.

Key Terms: Information Seeking Behaviour, Information Explosion, Current Awareness, Information Channel.

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INTRODUCTION

Information is the foundation stone of knowledge. It is the source which helps in decision making, management, research, education or career in any profession. It is the most essential ingredients for one's survival and existence. Users' studies are conducted primarily on behavior of the users in seeking information and it does not matter the level and type of information system to which they affiliate and what they seek. These studies are useful to analyze the faculties, psychology, attitude, the subject field in which he is interested the working condition and his position in the society that considerably influence his real need. Information seeking behavior has become a determining factor in designing any information system or to bring suitable improvement to the existing system. Therefore information seeking and gathering plays a vital role in all active teaching and learning methods. Academic libraries are prominent organizations which plays a crucial role in fulfilling the information needs of its users. Teaching is an art and teachers should update their knowledge then and there for effective teaching. Latest information in their respective field will support their teaching needs and support their work of research and other activities. Any source of information the faculty needs should be available in the library. That can be in the form of text books, Periodicals, or Audio Visual materials etc.

Needs of the users vary with the kind of the user. The user's needs are to be satisfied at the earliest possible time. It is the Librarians responsibility to make the user comfortable and then elicit his needs by putting a series of questions. As the work progresses and time passes, users need also changes. First users need should be analyzed and according to their needs sources are identified. Several new methodologies such as Databases, Documentation and information services and publications are resorted to while seeking information and making the information more user oriented.

DEFINITION

The Online Dictionary of Library and Information Science defines information as 'Data presented in readily comprehensible form to which meaning has been attributed within the context of its use'. The term information seeking behavior has been used in the research literature since the 1950's. Information need, then, leads to information seeking. According to Wiberley et.al. (1989), information seeking is a basic activity in which all people participate, manifest through particular behaviors. Wilson (1999), defines it, "those activities a person may engage in when identifying their own needs for information, searching for such information in any way, and using or transferring that information". Information seeking behavior is "a manner in which a user conducts himself in relation to a given information environment. It is therefore regarded as essentially a process of inter action between the user and the rest of the information system.

LITERATURE REVIEW

Sankari et.al. (2011) studied about the information seeking

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behavior of users of engineering college and found that document delivery services is in demand. The researchers need more indexing, abstracting and interlibrary loan services. They stretched about user orientation services, seminars and workshop to be conducted often.

Kingkawe et.al. (2005) carried out a research work on "Information seeking behaviour of faculty members of Rajabhat University in Bangkok" and found that information needs can be meet by the large collections of library materials. A person in the library should be knowledgeable to meet the users needs. Adequate training programmes for staffs for using the libraries OPAC, tools for searching facilities, online data bases, using electronic journals, introduction for indexing and abstracting services should be given.

Bhatti (2009) reports that faculties use library resources for teaching than resource purposes. Inter library loan is essential for better performance. There is a shortage of current journals and a need of a liaison officer for better communication between the library and the faculty.

Thanuskodi (2009) reveals that the faculty uses electronic information sources less frequently than the printed sources. The reference section should be equipped with adequate information sources.

NEED AND SIGNIFICATION

A faculty, whatever professional name he or she may be called by performs one basic function teaching. Teachers of the college will require information on the subject where they are teaching. If any faculty wants to be taken seriously by their students and colleagues, they will need to constantly update their existing knowledge. The college teacher is more vulnerable than the school teacher as his work is under constant seeking by the students who will not just swallow anything that he presents no matter how eloquent the language. Thus the college faculty is required to be through up to-date with the subject he is teaching. Added to this, there is also the need for information on text and examinations, rights and duties, benefits and to some extent administration. Text books, discussions with colleagues, reference books, monographs and formal articles are useful for information on the subject on his teaching. Formal articles, abstracting and indexing services, attending seminars and conferences discussion with colleagues and browsing the internet can go a long way in helping teachers keep up to date.

STATEMENT OF THE PROBLEM

Knowledge is more power full and information is needed for all human beings. The era of information technology changed the status of library in 21st century. Right information to the right user at the right time with precision is becoming a need in an information society. Information seeking behavior involves personal reasons for seeking information, the kinds of information which are being sought, and the ways and sources with which needed information is being sought.

Libraries play a vital role in modernizing the society. Librarians should equip themselves to deliver the right information to the right reader. Nowadays information's are sold and it is becoming harder to get information without money. Due to the increase of e-resources librarians should ensure that every information should reach its reader when ever it is necessary to meet its purpose and ensure the following effective functioning of the library:

- Do Faculty members seek and obtain information, what are the related issues?
- What information resources do teachers value, where do they find them?
- What role do they have in information seeking?
- What other factors influence the faculty members information seeking behavior?
- What kind of information sources do they use current awareness, research and lecture preparation
- How do lecturers rate the library in its ability to m their information needs?
- How do they manage to get the needed materials?
- Do they face any difficulty to access the information
- Are they away of the channels of information?
- What are the barriers to information provision in and science college libraries and how can these overcome?

METHODOLOGY

The present study is based on survey method for collection data. A pre ordained structured questionnaire has been design anticipating the information needs, seeking behavior and pattern of faculty members of V.L.B Group of Institutions.

These will be divided among two Colleges V.L.B and Sri Krish Arts and Science. The questionnaire was distributed to respondent of both the institute. A random samplings has be taken in each colleges. In addition, a visit has been taken to libraries of both the colleges to meet the library experts so a acquire more useful information for their purpose.

DATA ANALYSIS AND DISCUSSION

Questionnaires were distributed among both the colleges. A of 150 questionnaires were circulated in that 110 duly fi questionnaires were received. The result of response rate 73.3%. The collected data were analyzed, classified a tabulated.

❑ Institute Wise Response

150 questionnaires were distributed to the faculty member VLBJCAS and SKCET. 110 filled in questionnaires were retur by the faculty members (63 in VLBJCAS & 47 in SKCET). overall response rate is 73.3%.

Table 1: Institute Wise Response

Institute	Questionnaire's Distributed	Response Received	%age
VLB JCAS	75	63	84
SKCET	75	47	62.67
Total	150	110	73.3

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Gender and Designation Wise Respondents

This table shows the designation and college wise respondents. The study finds that out of 110 respondents lecturers 48(43.63) take the majority, 35(31.81) are Asst professors and 27(24.54) are professors. 31(28.18) are male and 32(29.09) are female from VLBJCAS and 34(30.90) are male and 13(11.81) are female form SKCET.

Table 2: Gender and Designation Wise Respondents

Desig.	VLBJCAS		SKCAS		Total
	Male	Female	Male	Female	Faculty
Lecturers	12 (25)	16 (33.33)	14 (29.16)	6 (12.5)	48 (43.64)
Asst. Professors	9 (25.71)	10 (28.57)	11 (31.42)	5 (14.28)	35 (31.82)
Professors	10 (37.03)	6 (22.22)	9 (33.33)	2 (7.40)	27 (24.54)
Total	31 (28.18)	32 (29.09)	34 (30.90)	13 (11.81)	110 (100)

Frequency of Library Visit

Most common aspect of the study is utilization of the library. The table shows the faculties visit to the library by their designation. According to the analysis lecturers from VLBJCAS (25.45) visit the library than SKCAS (18.18).Same as Asst.Professors of VLBCAS (17.27) visit the library than SKCAS (14.54). Same as Professors of VLBJCAS (14.54) visit the library than SKCAS (10). This table shows faculty members of VLBJCAS visit the library very often for their purposes. There is no major difference between the faculty members of both the college in Information seeking behavior.

Table 3: Frequency of Library Visit

Designation → / Frequency ↓	Lecturers		Asst. Professors		Professors	
	VLB	SKCAS	VLB	SKCAS	VLB	SKCAS
Daily	9	8	11	7	5	4
Weekly	12	6	4	5	7	5
Fortnightly	5	4	3	1	2	2
Monthly	2	2	1	3	2	0
Total	28 (25.46)	20 (18.18)	19 (17.27)	16 (14.54)	16 (14.54)	11 (10)

Purpose of Library Visit

The question was asked about the usage of library by the faculty members. This table shows that 21(19.09) respondents responded from VLBJCAS and 17 (15.45) from SKCAS use periodical section .11 (10) from VLBJCAS and 8 (7.27) from SKCAS use Reference section. 23 (20.90) from VLBJCAS and 11 (10) from SKCAS use digital library section for online data bases. 4 (3.63) from VLBJCAS and 5 (4.54) from SKCAS use Abstracting and indexing services. 4 (3.63) from VLBJCAS and 6 (5.45) from SKCAS use reprographic services.

Table 4: Purpose of Library Visit

Purpose	VLBJCAS	SKCAS
Reading Periodicals/ News papers	21 (19.09)	17 (15.45)
Reading Reference books	11 (10)	8 (7.27)
Using Online Data Bases	23 (20.90)	11 (10)
Abstracting & Indexing services	4 (3.63)	5 (4.54)
Reprographic Services	4 (3.63)	6 (5.45)

Specific Reason for Library Visit

The faculty members were asked to give the specific reason for their library visit. 12 (10.91) in VLBJCAS and 10 (9.09) in SKCAS have said they visit the library for self development. 23(20.90) in VLBJCAS and 20 (18.18) in SKCAS use it for curriculum based works.

10(9.09) in VLBJCAS and 7 (6.36) in SKCAS use it for research and development. 8(7.27) from VLBJCAS and 5(4.54) from SKCAS use it for monitoring the students in their library hours. 6(5.45) from VLBJCAS and 5 (4.54) from SKCAS use it for career guidance and placement programmes.

Table 5: Specific Reason for Library Visit

Reasons	VLBJCAS	SKCAS
Self Improvement	12 (10.91)	10 (9.09)
To support the curriculum	23 (20.90)	20 (18.18)
Research and development	10 (9.09)	7 (6.36)
Monitoring the students	8 (7.27)	5 (4.54)
Career guidance/ Placement	6 (5.45)	5 (4.54)

Problems Faced During Their Search for Information

Table 6 shows the difficulties faced by the faculty members while seeking information. 10(9.09) from VLBJCAS and 5(4.54) from SKCAS finds the shortage of resources. 20(18.18) from VLBJCAS and 2(1.81) from SKCAS finds the lack of facility in the library. 8(7.27) from VLBJCAS and 5(4.54) from SKCAS has the lack of searching the materials. 4 (3.63) from VLBJCAS and 8(4.54) from SKCAS do not have proper idea about the availability of resources. 6(5.45) from VLBJCAS and 10(9.09) from SKCAS take more time in locating their resources. 7(6.36) from VLBJCAS and 4(3.63) from SKCAS has technical difficulties.

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Table 6: Problems in Search for Information

Problems	VLBJCAS	SKCAS
Shortage of resources	10 (9.09)	5 (4.54)
Lack of facilities	20 (18.1)	2 (1.81)
Lack of searching skills	8 (7.27)	5 (4.54)
Lack of awareness about the library resources	4 (3.63)	8 (7.27)
Time duration during the search	6 (5.45)	10 (9.09)
Technical difficulties like power failure, Internet connection etc	7 (6.36)	4 (3.63)
Not taking proper assistance from the library staffs	5 (4.54)	9 (8.18)
Distance to the library	7 (6.36)	4 (3.63)

- **Adequate Training for Staff**

Table 7 shows that respondents from VLBJCAS 22 (20.00) and 12 (10.91) from SKCAS says training programmes is essential. Where as 34(30.90) from VLBJCAS and 26 (23.63) from SKCAS says that training programme is not necessary for them.

Table 7: Adequate Training for Staff

Training	VLBJCAS	SKCAS
Yes	22 (20)	12 (10.90)
No	34 (30.91)	26 (23.64)

CONCLUSION

The finding of this study indicates that information seeking behavior may be motivated by a wide variety of needs, including personal, professional, entertainment, etc. The successful operation of a library depends to a large extent on the choice of library collections. The collection should meet the needs and requirements of the users. Consequently, librarians must be aware of how faculty seek information. Knowledge of faculty information needs and information-seeking behavior is imperative for developing valuable collections, and improving facilities and services. It also indicates the necessity of train programmes for staffs. It is also observed that majority of faculty members use the library to support their curriculum both the libraries. Shortage of resources or lack of facilities sho not effect their lecture preparation. The academic librarian each libraries should take adequate steps to over come problems faced by the faculty members. If it is done so a high le of awareness about learning resources and quality education be given to the students.

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Gendered Digital Divide in Library and Information System

Sohini Sengupta Ray* and Dibyendu Paul**

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*Librarian
S A Jaipuria College,
Kolkata

** Associate Professor
Deptt. of LIS
University of Calcutta,
Kolkata

Corresponding Author
Sohini Sengupta Ray
sohini01feb@gmail.com

ABSTRACT

The focus of this review article is on gender division in LIS profession in the perspective of ICT environment. It addressed three sets of relationships like profession and technology; profession and gender; and the technology and gender to evaluate women's participation in LIS profession in the current day's perspectives. Two inverse trends like feminine LIS profession and masculine technological competency have been revealed from current literatures. The setting of these two characteristics in a specific time and space depends on the archetype of particular socio-economic-cultural conditions. The cultural orientation and the achievement motivation are the two interdependent elements that have to be measured to evaluate women's participation in LIS in gendered digital divide phenomena.

Key Terms: LIS profession, Gender division, Digital divide, Women's participation, Profession and gender, Gender and Technology.

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INTRODUCTION

Women's participation in various social and professional activities especially in library and information system (LIS) profession is not a very recent point of interests. Digital divide is a much known issue and well discussed in LIS domain too. There is enough scope in LIS research relating gendering of technology and gendering of profession with digital divide. Present article is going to relate these aspects. Whether gendering is running on LIS profession in the perspective of application ICT in LIS is one of the important focuses of our discussion. How gendering compounded digital divide in library profession? Are existing definitions to understand digital divide adequate when we are looking it in the perspective of library and information activities between men and women? Does library profession still remain 'gendered' in the perspective of current trend of technological revolution?

There are relationships between technology and librarianship, librarianship and gender, and it is between gender and technology. The relationship between technology and librarianship is quite direct and visible but still enough areas of research are lying unfilled. The relationships between librarianship and gender, and technology and gender are also important to be considered to evaluate women's participation in LIS profession in the current day's perspectives. The result of gendered profession and gendered technology may compound the digital divide in LIS too. All these aspects in LIS perspectives are the outcome of the relationships between technology and society; and gender and society.

DIGITAL DIVIDE

The advantages of ICT are not reaching equally to the cross section of the people. Its benefit is mainly going to those who are well placed and who can easily access to that information. It has given birth to a new kind of division or inequality in the society, which is commonly known as digital divide. The digital divide is a concept through which the inequality in computer technology use is mapped. The digital divide is not a simple gap between two groups of our society: digitally-equipped and not equipped. The gap due to this is much more complex. The complication is actually due to various factors involved in this context. It "... is multifaceted and offers the label 'digital divide' as a way to highlight the multiple dimensions included in it. Digital divide(s) is understood as a concept that reflects the inequalities derived from the digital environment but that should be studied in a continuum with other socio-economic inequities", Barzilai-Nahon (2006). The other socio-economic inequalities, in this respect, include the gender discrimination.

GENDER DIVIDE

Gender is different from sex. "Sex refers to anatomy and physiology and gender refers to the accompanying social behaviors. Gender refers not only to women or men, but to the socially defined roles of each sex, as well as to the relation between them. Gender is something that is accomplished through interactions with others, yet incumbent within social institutions." West et.al. (1987).

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According to World Health Organization (WHO) Gender refers to the socially constructed roles, behaviours, activities and attributes that a particular society considers it appropriate for men and women. Again WHO analyses that the distinct roles and behaviours may give rise to gender inequalities, i.e. differences between men and women that systematically favour one group.

According to Gerda Lerner (www.trinity.edu/mkearl/gender.html) in 'The Creation of Patriarchy' gender is the 'costume, a mask, a straight jacket in which men and women dance their unequal dance'. As Alan Wolfe (www.trinity.edu/mkearl/gender.html) observed in 'The Gender Question' 'of all the ways that one group has systematically mistreated another, none is more deeply rooted than the way men have subordinated women.'

GENDERED DIGITAL DIVIDE

Gendered digital divide is actually leads towards study of digital divide through a gender lens. Women have historically little access to media, communication technologies and the opportunity to build communities and share experience with other on a global basis. Now, the gendered digital divide is an extension of the digital divide concept and focuses specifically on the inequality of women's access to and use of information technologies.

Digital divide generally means the statistics of usage and access of internet or new ICT. But in the context of gender influenced society it can be said, that technology is not merely a thing, it is an action and so it has to be implemented. "Therefore when people do technology, they are also doing gender", Mackkenzie et.al. (1985).

GENDERED DIGITAL DIVIDE IN LIS PROFESSION

Now the question may arise what is the concern of digital divide in library and information service activities? What is the concern of the profession with gendered digital divide? The environment surrounding the library and information centre has been seriously changing because of the social and technological change that took place in the last few decades. It has made a great advancement by popularizing internet access and its use by people throughout the world. In this context, librarians need to redesign and redefines their services for their users. They also need to review the various IT devices and information services available and examine which can be employed to present a more effective library service.

In librarianship profession gender divide is also one of the factors. In the early twentieth century females were performed lower rank services and males are performed higher status management positions in librarianship profession, Hildenbird (1992). But women have dominated the profession in numbers, Williamson (1923), Phenix (1987) and for that reason some critics thought that librarianship is a feminine profession, Williamson (1923), Ashapurna Devi (1961), Brand (1996) which may be debatable.

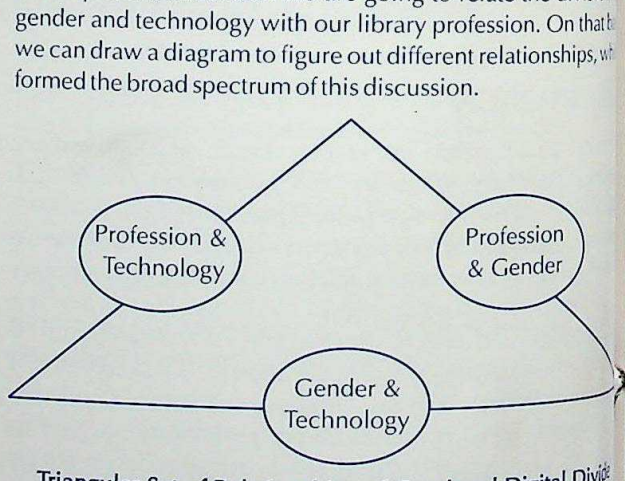
There are many reasons why women opted to take up librarianship as a career:

- Women who wanted employment but were not particularly prepared to teach, considered librarianship is a good alternative, because the environment would be academic whereas the work will not have the requirement of teaching on a regular basis.
- Security of women is a major factor in any country work place which ensures security has a very impo role in women's employment.
- Librarianship generally does not demand mobili service and women are not expected to be m outside the family structure.
- The qualities expected in a women like persevera thoughtful, judicious etc. are suited to the activities library, Dasgupta (1997).

There is a trend of shifting of different service areas of library, as reference, cataloguing, and collection development to domain of lower paid, non-professional staff. Harris (19 Dilevko et.al. (1997) This shifting is also happening in country, but in some different ways and that is by outsourcing total thing. Such siftings are happening in the librarian profession because now-a-days the emphasis is given on besides the traditional service part. The service aspect is associated with feminine part where as the ICT is associated masculine nature. As we have witnessed that society thinks technology is by type masculine in nature, Fallon (19 Cockburn (1983). Increasing dependency on ICT in librarian provokes an attempt to associate librarianship with mascul and thus causing the problems of gendered librarian profession.

ISSUES OF GENDERED DIGITAL DIVIDE IN PROFESSION

In our present discussion we are going to relate the divisions gender and technology with our library profession. On that b we can draw a diagram to figure out different relationships, w formed the broad spectrum of this discussion.



Triangular Set of Relationships of Gendered Digital Divide

The relationships among librarianship, technology and gen are prevailing within the societal perspective. The centre attention of this phenomenon is the relationships of gender the profession and technology.

These three sets of relationships are independent but not isola These relationships, in a coherent framework, are to be explo to understand the issues and effects of the gendered digital di in our contemporary space and time. We are going to look these relationships by analyzing some literatures.

Profession and Technology

The library and information centers have changed radically o the few decades and so the library and information profession to the adaptation of technology. Concurrently a successful

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professional of today should have technological leadership, integration and should label himself or herself technology savvy. Technology reshapes both the library resources and tools for resource organization and its delivery. It serves as a determined extension of the LIS system and the professional not just adds-on. The association of LIS profession and technology is spectacular. In this association the both professionals and technologies are not free from related social hazards like gendering and digital division.

Profession and Gender

The identification of the profession in respect of gender got importance in many literature like Golub (2010), Carmichael (1992), Phenix (1987), Piper et.al. (2001) etc. All most all in these works the librarianship profession is characteristically described as a feminine profession. Though most of the experiences come from the developed nations, the gender divide and low status of the librarianship profession due to the association of female dominated workforce played a major role in its continued lack of professional status.

Golub represents the historical evidences of shifting of librarianship profession from masculine to feminine during the last hundred years. In the twentieth century in librarianship profession female performed lower rank services and male performed higher status management positions. Over the last century women have dominated the librarianship profession, and for that reason some critics thought that librarianship is a feminine profession. According to Phenix the women candidates were available in this profession because they are 'cheap and available'. There argument does not overlook the presence of males in numbers in this profession. Carmichael, in this respect, argued that those men who choose this profession have: social ineptitude, lack of ambition, and failure at other fields of endeavour.

Interestingly, the above mentioned conceptions are also true for defining a feminine job. But this argument, on the other hand, opens another scope of study of current status of the profession and the reasons behind it.

In the present Information age, according to Piper & Collamer, librarians are trying to boost self and outside image by adopting transformed titles like information manager, knowledge manager, information broker, and cyberian. This adaptation is socially accepted as there is a general notion that managerial positions are generally dominated by male members in different institutions. Is it a notion to disapprove the labeling the profession as feminine one?

Technology and Gender

There are several other works highlighting the relationships between technology and gender like Fallon (1998), Cockburn (1983), Wajacman (1996) etc. and Gurumurthy (2004) on Indian condition.

According to Fallon (1998) women's experiences with technology have historically been limited and dominated by men. The origin of computers owes much to the achievements of women, with women pioneering information processing systems during the 1940s. However, this job later became culturally reconstructed as men's job when more complex skills were deemed necessary. This gendered redefinition of skill reflects how cultural contexts affect the social shaping of technology.

Different childhood exposure to technology, different forms of schooling and the inequality in the job market all lead to, what, Cockburn (1983) describes as, 'the construction of men as strong, manually able and technologically endowed and women as physically and technically incompetent.'

Judy Wajacman, in an influential book 'Feminism Confronts Technology', examines the interrelationship of gender with technology and argues that western societies construct technological competence as a masculine culture. Indian context, according to, Gurumurthy (2004) women have multiple identities and that interplay with gender to define women's access to technology. The role of women in technology is shaped by roles of childcare provider, social formalities etc.

CULTURAL ORIENTATION AND ACHIEVEMENT MOTIVATION

Successful participation of women librarian/manager have to be judged from two aspects, i.e. their potentiality in the organization, how successfully they can achieve in this gender discriminated society and secondly how much technologically competent they are in this present digital era. Because whenever the technology concerns it becomes a 'male thing' and that time the digital divide concept becomes the gendered digital divide.

To judge this entire thing in LIS profession, like any profession, we have to understand the motivational factors of the women's participation in the organization because the motivation can help an employee to give best to his or her organization. Again to measure the motivational factors we have also to look at the society and its culture because both have great influence on achieving motivation of an employee in any organization. Our present society is divided, beside other divisions, by gender, by digital power. So the gendered digital divide may also influence the motivational factors of women participators in Indian LIS profession.

Cultural Dimension

Every human being lives in a society. Again, each society has its own cultural aspects. Different cultural values build up different requirement in any society. As we know, that there are two different cultural orientations: individualism and the other collectivism. An individualistic culture is one in which people tend to view themselves as individuals and to emphasize the needs of individuals. In general, western culture tends to be individualistic. A collectivistic culture is one in which people tend to view themselves as members of groups (families, works, units, tribes, nations) and usually consider the needs of the group to be more important than the needs of the individuals. Most of the Asian and other under developed countries' cultures tend to be collectivistic.

The fundamental difference between individual and collectivistic culture lies in the difference in handling the relationship between individual and community. Triandis (1990), summarizes the differences in values between individualistic and collectivistic cultures. He writes that in collectivistic cultures, the cardinal values seem to be reciprocity, obligation, duty, harmony, obedience to authority, equilibrium and proper action and in

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individualistic culture the cardinal values seem to be creativity, bravery, self-reliance, solitude etc.

The men and women have similar traits, motivations, leadership, styles and skills. According to Brenner (1988), women can perform equal to men in similar situations. But still our thinking of men and women in managerial position in equal status is limited. This limitation is due to our certain prevalent believes. According to Kram et.al. (1998), an ideal manager seems to be non-emotional, aggressive, ambitious, objective and responsible. These characteristics of an ideal manager sticking in our mind impede with the stereotypical impressions about women. If women are aggressive, ambitious and non-emotional they are tagged as 'too masculine', because they are violating their traditional caring, compassionate and relationship oriented roles. Again if they become managers with their traditional qualities they are alleged as violating leadership roles. The differences in LIS profession are lying in this multidimensional society. Our Asian culture is basically collectivistic and the characteristics of collectivistic culture are shown in different organization. In any organization there are certain trends regarding different positions of the organization. Among them one trend is that managerial position must be kept for male employees only.

Achievement Motivation

In this context, to understand the potentiality of managers/employees in an organization there are certain measures. One among them is 'Achievement Motivation' factor. Murray (1938), defined the need for achievement (nAch) as the desire to do things well, to accomplish something difficult, to overcome obstacles, to attain a high standard, to excel, and to surpass others. Greatly influenced by Murray's et.al. (1953) conceptualized nAch terms in their own different ways. Their analysis of the antecedents to achievement behavior focuses not just on the motivation to achieve but also on the motivation to avoid failure.

There has been a resurgence of interest concerning to the theory and measurement of the construct of achievement motivation, Asbury (1974), Atkinson et.al. (1974), Clarke (1973), Ory (1976), Waters (1976), Kuhl (1979) etc. Many different measures have been developed to assess this construct. Among them one popular theory is Ory & Poggio's Achievement Motivation Theory (1976). This theory reports the creation of an objective, self-report, objectively scored measure of achievement motivation. In this study 153 self-report items were administered using a matrix sampling approach to 1324 subjects to eight Universities in six states. Using the simplified version of Ory & Poggio's Achievement Motivation Theory (1976) Sarala R. Murgai (1999 & 2004) did studies on motivation to manage and status of women in LIS in different countries like USA, India, Thailand, Singapore and Japan. In her study she actually examined the views of LIS students from different LIS schools of different countries about their thinking regarding the management positions in LIS profession and their likings of 'women as managers'. Because it is assumed that the present LIS students will be the future LIS professionals. With the help of her measurement one can identify, in an organization, how much their employees are motivated to make the organization more productive and profitable. Besides that we could put this measure on the five dimensions of culture devised by Geert Hofstede (1980). Because, it is believed Hofstede et.al. (1997) that prevalent cultural values have a g impact on managerial styles, leadership and skills and only th who are able to change and adopt the theories of achieven motivation according to their local values are able to implem them successfully.

CONCLUSION

Study on women's participation in LIS in general and effec gender divide and digital divide on profession and the sys specially requires a different approach. Technology librarianship have their own courses of action but not isol from socio-cultural perils. For women librarians and sim position in the profession the discriminations in livelihood of dignity and distinction in workplace, uncertainty in pat support, work at the mercy of authority etc may not be visib the first place. The overwhelming presence of women in workforce may not justify that there are no such gender divis The growth and development of ICT application in LIS is requiring to look from the point of view of gendering technology too. Women's motivation to achieve the g personal as well as the organizational, is require to measure socio-cultural as well as from technological point of views.

The current literatures are showing two inverse trends: femi LIS profession and masculine technological competency. setting of these two characteristics in a specific time and sp depends on the archetype of particular socio-economic-cul conditions. Indian archetype is quite different from so m western or developed socio-economic conditions. Women h numerous identities interplaying with gender to define wom admittance to technology. The role of women in technolog shaped by socio-custom system of the particular archetype.

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From Print to Electronic: An Analytical Study of Changing Preference among Users of Health Science Libraries in Haryana, Chandigarh and Del

Ashok Kumar* and Dinesh K. Gupta**

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*Research Scholar
**Prof. and Chairperson DLIS
Kurukshetra University
Kurukshetra

Corresponding Author
Ashok Kumar
gargasok@gmail.com

ABSTRACT

Users of health libraries have also undergone changes in preference of use of journal With the advancement of technology and global demands, users are slowly shiftin and adapting to this change. This paper studies the opinion of users of Medical libra about access to E-Journals Vs Printed Journals and the comparative degree agreement about Print Journals and Electronic Journals. The study is conducted o 954 users of health science libraries of Haryana, Chandigarh and Delhi Region Findings of the study signify that users are either preferring e-journals or a uncertain about it. Print journals still find wide applicability and this transition w take time to settle down.

Key Terms: Print Journals, E-Journals, Sampling Technique.

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INTRODUCTION

In the modern era of information technology and internet, knowledge is most powerful asset of any country, Goria (2012). The 21st century has witnessed a lot of changes in the users of medical libraries in India. The libraries are no longer considered to be the store house of books and print material. Rather this role has undergone drastic transformation in the modern society. Now they are considered to be the resources which are multidimensional. From print resources to digital resources, these libraries are now playing more active role in assisting the modern researchers. The current global society strives to lay much stress on information assets and their usefulness. The first generation libraries relied mostly on the books and journals available in print form only. It took lots of effort to keep these print materials up-to-date and in a safe condition. But, the present century is witnessing innovative impact on the publishing and information delivery systems due to the emergence of the Internet and the digital world around us. A significant change in the global information process has been noticed in the publication of journals and other important information resources in electronic form.

TRADITIONAL RESOURCES

Print resources have dominated the libraries over a number of decades. These resources still occupy and assume great importance in the field of information and library sciences. This importance and relevance in all spheres of life and education cannot be overlooked. They have played significant role in meeting the demands of the users of medical libraries too. Print resources still find wide applicability, but the quickly shifting scientific atmosphere has shaped newer avenues for research and medical libraries. Global competition and transforma have forced us to shift towards these electronic media. P journals are facing competition from the faster and more re sources of information. However, we can't overlook the va benefits that books give us. Print media is still one of the available forms of information both for students and teach equally. However, there is a need to transform and cha ourselves according to the needs of the global society.

E-JOURNALS AND THEIR IMPORTANCE

The world is going digital, so are the information resources. U now want data more quickly. They do not have time to see check the pages in a book. Rather, they are gearing up to scro data on the internet. The rapid growth of information has pose new challenge to the libraries, which has led to the sea chang the information seeking behavior of the library users, Kaur (2012).This has given birth to e-resources of informa Electronic journals are recent additions to the field of informa sciences. In order to getter quicker access to information, th was a need to create these resources. Electronic journal ca defined as the journal in which the end product can be obta electronically. The users can get online access to these E-jour either free or for a nominal fee along with print subscriptio such access is provided either by the publisher or through aggregators. Getting access to E-journals involves va modalities viz. identification of journals, corresponding with publishers/aggregators, signing the agreements etc, Halij et.al. (2004). Users are ready for this challenge, as they get and efficient sources of latest and updated information in no

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CHANGING USE PATTERN FROM PRINT TO ELECTRONIC

Growth and change is the order of the nature. We have to adapt to all changes happening around us. Similar is the case with information system. A substantial amount has been written about growth and change in key indicators in the electronic information environment, Sweeney (2007). With the surfacing of newer technologies, information technology applications and particularly Internet, there has been a transfer from conventional print journals to E-Journals. Electronic journals are presenting remarkable possibilities and advantages over print journals like simplicity of use, anywhere-anytime accessibility, allocation ability, hyperlink to related text or multimedia content. Thus the collection of library gradually changed from printed to digital, Sahu et.al. (2012). There is a huge change taking place in libraries. Library consortia in today's digital age are quite different from that of library networks in yester years, Talmale (2012). ICT has changed libraries to providers of a gigantic warehouse of information in a range of formats and the manner in which they supply their services. Proxy servers and virtual private networks allow users to connect to library resources remotely: hyper linking with integrated library systems publicizes the position of resources, regardless of design: Electronic journal management programs can merge or divide aggregator databases to assist searching; adaptive hardware and software, such as voice recognition software, enable disabled patrons to interpret resources without requiring the library to present a human reader or interpreter, Wu (2005). Therefore, users of health science libraries are also showing adaptation towards these digital resources as they make them globally competitive.

RATIONALE OF PRESENT STUDY

All changes are to be properly communicated in order to enable better adaptation and adjustment. An insight into this transformation can facilitate effective change over. Similar is the case with libraries, which are moving from a ware house protection to an information gateway or portal. Librarians are facing several challenges in providing information, Connaway (2003). The reason for selecting the present study is primarily to assess the user's preference of the print and e-journals. A comparison of these sources of information will provide useful data regarding the requirements for better results. Also, all users have different needs which can be fulfilled by different sources of information. This creates the need to understand the information needs of people engaged in various professions, Aggarwal (2012). The user's preference for electronic journals has also increased over this period of time. There is a need to study this transformation. Thus the topic of study is important in the present context.

OBJECTIVES

- To study the user's opinion about access to E-Journals Vs Printed Journals.
- To study the user's comparative degree of agreement about print journals and electronic journals.

DELIMITATIONS

- The present study is delimited in terms of the sample size, i.e. 954 users from 11 medical/ health libraries are selected for filling the user's questionnaire.
- The study is delimited to three states, i.e. Haryana, Chandigarh and Delhi.

POPULATION, SAMPLE AND SAMPLING TECHNIQUE

The present investigation is conducted in the Health (Medical) college libraries of Delhi, Haryana and Chandigarh. A survey was conducted using a questionnaire and a covering letter.

The study is conducted on the users and librarians of medical libraries in Haryana, Delhi and Chandigarh. So, all the users of these libraries in all colleges of these areas formed the population of users of the present study.

The researcher distributed 125 user questionnaires in each of the eleven medical libraries. Therefore, a total of 1375 user questionnaires were distributed by the researcher. A variable number of questionnaires were returned by the users. Out of the filled-in questionnaires, some were found incomplete, which were removed. After selecting the fully-filled questionnaires, a total of 954 questionnaires were obtained. Thus, the experimental sample consists of 954 users in 11 medical libraries of medical colleges in Haryana, Delhi and Chandigarh.

DATA ANALYSIS AND INTERPRETATION

The users of health science libraries were asked to express their opinions about their access to print journals and electronic journals and also their degree of agreement about the uses of the two types of information resources. The collected data is presented below in the form of tables:

Table 1: Opinion about Access to E-Journals Vs Printed Journals

Opinion	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
More User Friendly than Printed Journals.	639 (66.98)	155 (16.24)	24 (2.51)	81 (8.49)	55 (5.76)
More Frequently used than Printed Journals.	630 (66.03)	120 (12.57)	122 (12.78)	52 (5.45)	30 (3.14)
Enhance access to Scientific/Research Papers.	671 (70.33)	95 (9.95)	188 (19.70)	0	0
Decrease the Quality of Research Literature	270 (28.30)	105 (11.00)	136 (14.57)	353 (37.00)	90 (9.43)
Increase Scholarly Productivity in terms of Publishing Papers.	588 (61.63)	183 (19.18)	83 (8.70)	60 (6.28)	40 (4.19)
Keep Current about Global Research & Development.	594 (62.26)	248 (25.99)	24 (2.51)	60 (6.28)	28 (2.93)
Distribution of Articles Easier and Less Costly.	596 (62.47)	200 (20.96)	40 (4.19)	78 (8.17)	40 (4.19)
Features like Editorial News, links to Other Papers, Alerts etc. are Useful.	634 (66.45)	173 (18.13)	87 (9.11)	43 (4.50)	17 (1.78)

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Table 1 given above shows the responses when the users were asked about their perception about the access to e-journals in comparison to printed ones. 66.98% users strongly agree that e-journals are more user friendly than printed journals, 16.24% agree and 2.51% are neutral regarding this feature. E-journals are more frequently used than printed material is agreed strongly by 66.03%, 12.57% agree it, but 12.78% are neutral and 3.14% strongly disagree. Access to e-journals enhances access to scientific/research papers is strongly agreed by 70.33% respondents, agreed by 9.95% and 19.7% are neutral for this. Access to e-journals, decrease the quality of research literature is disagreed by 37%, strongly disagreed by 9.43% and 28.30% strongly agree, 11% agree and 14.57% are neutral in this case. 61.63% users strongly agree that access to e-journals increase scholarly productivity in terms of publishing papers and the percentage of agreed users are 19.18%. E-journals keep current about global research & development is strongly agreed by 62.26%, agreed by 25.99% and 2.51% are neutral. Distribution of articles is easier and less costly in accessing e-journals is strongly agreed by 62.47%, 21% agree and 4.19% are neutral. Some features of e-journals like editorial news, links to other papers alerts etc. are useful, is strongly agreed by 66.45%, while 18.13% agree and 9.11% are neutral. We notice here that most of the items are strongly agreed upon by the users in favour of e-journals.

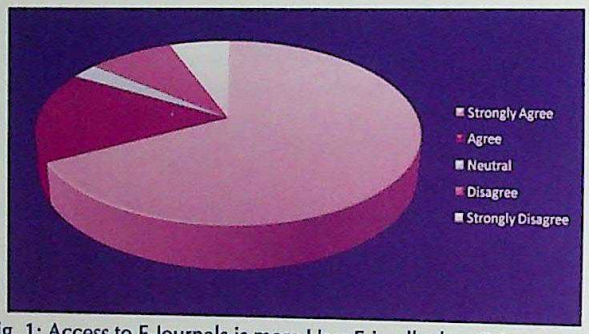

Fig. 1: Access to E-Journals is more User-Friendly than Print Journals

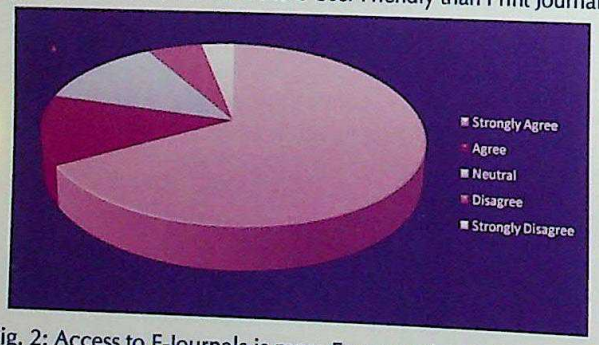

Fig. 2: Access to E-Journals is more Frequent than Print Journals

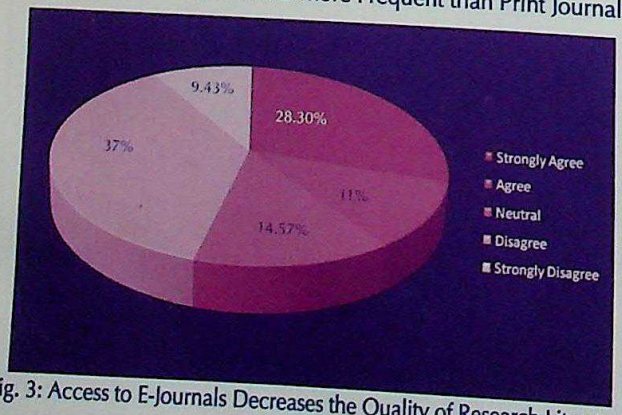

Fig. 3: Access to E-Journals Decreases the Quality of Research Literature

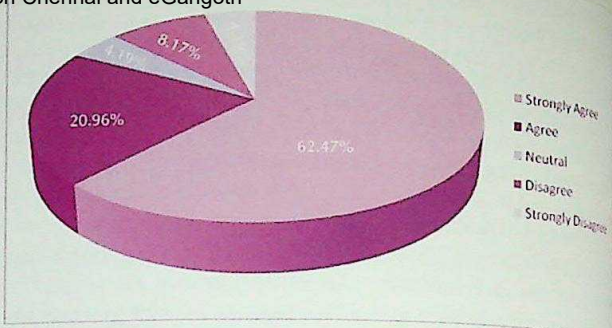

Fig. 4: Access to E-Journals Makes Distribution of Articles Easie and Less Costly

Table 2: Comparative Degree of Agreement about Print Journa and Electronic Journals

Electronic vs. Print Journals	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Research in my Field/ Area/ Discipline is Dependent on the Library's Electronic Journals.	709 (74.32)	95 (9.96)	150 (15.72)	0	0
Research in my Field/ Area/ Discipline is Dependent on the Library's Print Journals.	54 (5.66)	101 (10.59)	554 (58.07)	245 (25.68)	0
Electronic Journals are a Suitable Alternative To Print Journals.	605 (63.42)	158 (16.56)	191 (20.02)	0	0
In my Field/Area/ Discipline back Volumes of e-journals go far enough back to meet my Needs.	617 (64.67)	113 (11.84)	224 (23.48)	0	0
In my Field/Area/ Discipline back Volumes of Print Journals go far Enough back to meet my Needs.	4 (0.41)	81 (8.49)	628 (65.82)	541 (25.26)	0
The Indexes and Databases, I use to Find Articles, Provide Good Coverage of Electronic Journal Articles.	269 (29.19)	165 (17.29)	520 (54.50)	0	0
Using the Online Library Catalogue makes it Easier to Locate Electronic Journals.	228 (23.90)	123 (12.89)	515 (53.98)	88 (9.23)	0

Table 2 given above shows the user's opinion about comparati aspects of print and e-journals with respect to their field. As evident from the above table, 74.32% users were strongly agre and said that research in their field/ area/ discipline is depende on the library's electronic journals, 63.42% users were strong agreed and said that Electronic journals are a suitable alterna to print journals, 29.19% users said that the indexes an databases they use to find articles provide good coverage electronic journal articles and 23.90% users said that using

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online library catalogue makes it easier to locate electronic journals. We also see that the number of neutral responses in many items is also more. It shows that users are not sure as to which medium is better for information seeking. But overall we can say that e-journals attain superiority over the print journals in various areas.

CONCLUSION

As is evident from the above tables and their analysis, we note that odds are heavily favoring the e-journals, as far as the satisfaction of information needs of users of health science libraries is concerned. This implies that users are shifting and adapting to the changes in information systems. However, we see that print journals have not yet lost their credibility. They are still popular among the users for being friendly and more specific and reliable. But, in order to remain abreast of the global demands and competitions, users need to shift from traditional to digital. This transformation has to be done by taking utmost care. Blind use of e-resources just because they are available, will not solve the purpose. We need to understand when and where to use what kind of resources. This shift however, is bringing an up gradation in the roles of present libraries. Therefore, understanding user's demand to improve the efficiency of utilization of e-resources has become a great concern and challenge for library staff, Hadagali et.al. (2012). They have an even more active role to play for fulfilling the requirements of the modern users.

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Journal article from an Electronic Database

Krebs, D.L. & Denton, K. (2006). Explanatory limitatio Cognitive development approaches to morality. *Psycho Review*, 113(3), 672-675. Accessed on 20.04.2007, Psyc databse (2006-08257-012)

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Vasper, J., Haak, S. & Nikkhah, G. (2007). Subthalamic nu brain stimulation in elderly patients-analysis of outcome complications. *BMC Neurology*, 7(7), 1-9. Accessed 20.04.2007, http://www.biomedcentral.com /content /pdf/1 2377-7-7.pdf.

Book

Damle, S.G. (2012). *Textbook of Pediatric Dentistry* (4th ed.) Delhi: Arya (Medi) Publishing House.

Chapter from a Book

Rao, A.V.R. (2010). Human volumes in organizations additional exploration. In S.K. Chakraborty (Ed.), *Human for Managers*, 136-147. New Delhi: Wheeler Publishing.

Book Review

Book reviews can also be a part of the Journal. The text of the review should be typed neatly in double space on one side size paper. The book review must contain author(s) name, the book reviewed, ISBN, Publisher, year of publication, n of pages and price. The reviewer should submit his / her designation, affiliation, e-mail, phone, fax with STD code a postal address on a separate sheet.

Revised Manuscript

While submitting a revised manuscript, contributors requested to include, the 'referees' remarks along with point clarification at the beginning in the revised file its addition, mark the changes as underlined or coloured text

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Social Citation 2.0 Tools: An Overview

Mangesh S. Talmale* and Surya Nath Singh**

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*Librarian
Karve Institute of Social Service
**Sr. LIS Officer
National Institute of Virology (ICMR)
Pune

Corresponding Author
Mangesh S. Talmale
elibmangesh@gmail.com

ABSTRACT

The paper is an overview of social citation, it's important for communication of writing in education, research, social activities and publications to present the knowledge. It describes the concept of citation, Social Citation, various needs of citation and Social Citation 2.0 tools advantages, applications, features, comparisons of Citeulike, Connotea, Mendeley, Zotero, Refwork and Web EndNote and suggestions. The paper also highlights the important role of Library and Information Science Professionals using SC 2.0 tools.

KeyTerms: Citation, Social Citation (SC), SC 2.0 Tools, Cannotea, Mendeley, Zotero, Citation Software Tools, Web2.0, EndNote, Citeulike.

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INTRODUCTION

There are various ways and means of communication. The general way of scientific communication, it is essential to know about what already have been carried out, what is being done currently in process on a particular field of the study and what new as advance thinking before writing and start the research. This required reference/citation support which is a significance of the location of resource, background of work, authenticity, as well as an acknowledgement of originator of idea as in-depth to that source. It can appear in different form and format and different pattern of references while referencing / citing references depending upon the type of the documents viz. books, articles, internet references and also as per instruction to the author(s) given for particular publications. Here LISc profession are playing major role to support the users in their referencing and writings. Library and Information Science (LISc) professionals are facing problems in the management of various bibliographical and full text documents to procure, store, retrieve and access a new knowledge. To know the specific pattern of the citation, it is essential to know the types of sources. Bibliographical details of references are the same but style of writing citations differ from one to other publications. This requires an exhaustive literature search manual as well as electronic from different sources. Traditionally the main sources of information were citations given as references and footnotes in journals, monographs, books, etc. Referencing by individual scientist i.e. references collected for his/ her own study only. Practically, authors do not do so in most of the time due to various reasons. Earlier author used to note down the sources of information containing all the bibliographical details followed by full text manually. They used to write same references in different style to suit the requirement of particular writing to suit publications repeatedly requirements. Now it is possible to switch over from one standard to other with a software based citation tools. This has been experience that awareness among the authors, users is not there at desirable extent. In the changing scenario of digital era the various tools and techniques are available to communicate and also managing their references and/or to cite/ refer as and when he/she requires same reference for various purposes. Web 2.0 technologies and the concept of social networking are gaining popularity more and more, especially with the new generation of users in digital era to promote sharing of resources, exchange of documents and data, online retrieval of information. These technological features provide a more interaction environment between the users and the web. Under Web 2.0 technologies are including Wikis, Really Simple Syndication (RSS) Feeds, Podcasts, Tagging and Social Citation tools. Social network sites providing the additional options for referencing to researcher, students, academicians, decision makers, etc. based on own interest and experiences. Social citation is a tool that allows researchers to write or express the citation for easy communication, exchange of ideas with colleagues and share similar research interests. Its applications are used to save and organize references in a personal database. Using same database of references, we can create different citations or lists of references (bibliographies) according to different citation styles, and much more. These tools also support sharing, online reference management (lists of resources), organizing and managing resources with other researchers in the same and for related field. Hence, it not only saves time and manpower but also avoid duplications.

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NEED

Writing is still a skill and the most popular method of traditional communication even today in the age of information technology (IT). It is mandatory to any writing especially scientific writings to cite the reference as an acknowledgement to original producer of idea, knowledge. Any writing requires supporting evidences to give authenticity and age to the work in scientific writing. Hence, there is need to have proper authenticated references so as to citations. Citation is an important because it is essential for education, research, social activities and publications to present the knowledge. Every invention or discovery is an improvement over the earlier one or a reinterpretation of an earlier theory. Bibliographies and reference lists are available in articles, books and databases. It consist of standard elements, and contain all the information necessary to identify and track down publications, including: author name(s), titles of books, articles, and journals, date of publication, page numbers, volume and issue numbers (for articles). It may look different, depending on what is being cited and its style used to create them. Consequently, it is essential to choose an appropriate style guide for his/her needs. There is various style of references/citation viz., American Chemical Society (ACS) style, American Psychological Association (APA) style, Modern Language Association (MLA) style." http://libguides.mit.edu/citation-tools, however, it is cumbersome to write again and again in same reference for different use and applications. It is important to cite sources used in research for several reasons are:

- The ideas are the latest to accumulate that currently to get the credit for their contribution. Hence, when an author cites references (ideas of others), he/she honors to those, who initiated the idea first.
- Failing to cite is a part of violation of copyright act i.e. violation of person's ownership idea/stealing idea of others. It is also important to have a list of reference sources for present and future use.
- The current publications also supports to perform and experiment to stand the results at the same time others scientist planning experiment to test their own findings or challenge the findings of others. In other words keep the track of sources to avoid the overlapping.

OBJECTIVES

- To explain about SC applications, uses and implementations for scientific communication.
- To develop awareness among the users about the usage of SC.
- To motivate users to enhance various applications of SC using modern citation tools and techniques.
- To help users to create their own databases and disseminating information.

REVIEWS OF LITERATURE

There is no systematic study carried out globally, however the ideas have been express by different authors in different forms on the internal. Consequently, it is very difficult to give a systematic review of literature for the present study. Zanng (2012) studied a comparison of select reference management tools viz. E Note/End Note Web, Zotero, Connotea and Mendeley and strength, weakness. Glassman et.al. (2012) discussed applications of mobile citation management software. R (2011) in his research paper described and comparisons Easybib Endnote, Mendeley, Reference Works and Zotero w specific criteria of product, in the library and price. Hens (2011) in his entitled,' citation management software features a future. She reflects on the role of librarian in choosing, promot and teaching citation management software. She examin Refworks, Endnote, Zotero and Mendeley and also gives benefits, drawbacks and librarian perspective. Ovadia (2011) his study titled Managing Citations with cost-free tools focuses various bibliographic management Internet tools viz. Zote Mendeley, Citeulike that are cost free for managing citatio McMinn (2011) review the current level of service and supp provided for the bibliographic management applicatio EndNote and RefWorks providing research libraries with baseline for benchmarking their support of these tools. Gilmo et.al. (2011) in research paper titled reference manageme software: a comparative analysis of four products compa reference management software viz. CiteuLike, RefWor Mendeley, and Zotero, in terms of features offered and t accuracy of the bibliographies that they generate.

SOCIAL CITATION (SC)

There are various ways for referencing the documents f academic and research and other supports. Traditiona bibliographical details are collected by the users for th references for different purposes. Now due to use computer bas references for getting full text articles as well as creating their o reference/digital databases. Social citation (SC) is one of them has been defined differently by different experts, associations professionals' etc. It is consisting of two words social and citatio According to Alan Cann, University of Leicester "If you c contribute to it, then it's social." It refers that we can see wh other are reading, who is reading the same things as you and wh you are influencing, built collaboratively by groups of researcher and find out what others think of resources read reviews etc, Al (2011). However, Citation represents writings compactly as t authority, age, subject matter and form of knowledge-scientific historical, or personal", Howard (2009). Social citation ha defined differently by different authors and there is no standar definition is available globally.

"SC is directly related to social book marking services to keep th track of research proper with international colleagues and also t enhance reading and own research activity. It shares specialize social bookmarking services which allow users to store, tag organize, share and search for bibliographic information Dedicated SC websites have the capacity to automatically locat and store metadata associated with individual references e.g authors, journal, date, pages, etc, Alan (2011). SC refers to storing sorting, classifying, sharing and searching through a collection o internet based bookmarked links of citable sources such as e journals, news articles, academic studies and interviews. Th functions are similar and directly inspired by social bookmarkin services but are intended to be used for the collection o academic and citable resources. SC sites function by using a application or website to bookmark a piece of information an

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store it on the Internet for personal use to share with a friend or group, or for public viewing. These citations can be tagged and organized into predefined categories or into a new category as defined by the user. The tags of all users are compiled together in order to create a searchable folksonomy of information within the SC site. This allows academics researching or interested in similar areas to connect and share resources. SC tools are designed to be used for researcher and information professionals to manage their reference.

Advantages/ Features of Social Citation 2.0 Tools

SC is streamline for managing their references. The philosophy behind SC is same as that of general referencing or social bookmarking. Many popular advantages of SC tools available globally with their different access styles are:

- Accessible from anywhere
- Time Saving
- It works with online databases to extract bibliographic data.
- It produces online bibliographies and reading lists.
- It shows other people what you are reading.
- It contributes to a free literature database.
- It shares references with colleagues and collaborators.
- It discovers papers other researchers find useful.
- It is allowing users to see which academic papers are tagged by the most people.
- It will automatically extract citation details in MLA or APA formats and will allow users to export their library to either BibTeX or Endnote to aid in building a bibliography, Collins (2012).

Application of Social Citation 2.0 Tools

Some of the ways in which SC can be utilized in education and research field include:

- The SC can be provided the cloud-based services to all students, faculty and staffs. Users can create shared folders of references on a specific topic and then invite others to view the folders contents, comment on the references.
- It also supports scholarly publishers, institutions to take initiative to provide citation-based interactions and created platforms, where citation-based networks are automatically generated on the basis of references common to authors' bibliographies and references.
- It provides new online collaboration particular in research and learning environment. It can import references into a site page as a resource and then invite others to comment on them.
- It allows citing and tagging resources for students to access and also helps students to bookmark and tag resources for bibliographies, works cited, and literature reviews.
- It also support in a project writing in which students have to find reliable sources on the internet related to a course topic and tag them into a SC site, http://www.citt.ufl.edu/toolbox/toolbox_socialCitations, Cope (2011).

Hence, SC tools plays an important role to help researchers to keep bibliography, share references with colleagues, collaborators and also discover papers other researchers find useful. These tools allow scholars to form online groups, build up their professional network individually and offer researchers an opportunity to improve the quality of their work, through enhanced ability to find, use and disseminate information.

Citation Software

Citation software also called "bibliographic software," "citation managers," or "reference managers". It helps you to import citations from your favorite databases and websites, build and organize bibliographies, format citations for papers, take notes on articles and save them in your collection of citations, save and organize PDFs, screenshots, graphs, images, and other files for your research, http://libguides.mit.edu/references. These tools allow researchers to capture bibliographic information about research materials, create bibliographies, add footnotes, and manage research collections. Some citation management tools also make it easy to share references with other researchers, Ovadia (2011). Citation management tools are applications used to save and organize your references in a personal database. Using your database of references, you can create citations or lists of references (bibliographies) according to different citation styles, and much more: you can share your research and collaborate with others, http://libguides.asu.edu/CitationManagement. The changing trend from reference manager to social citation has been illustrated in figure 1.

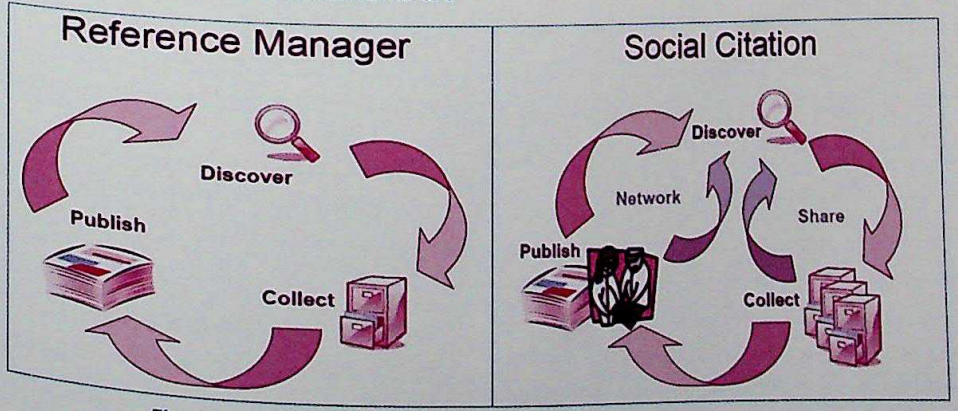

Fig. 1: Changing trends from Reference Manager to Social Citation
(Source: http://wiki.bath.ac.uk/download/attachments/.../SocialCitation.pdf, Gilmour et.al. (2011).)

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Social Citation 2.0 Tools

There are various citation tools are available to manage the references (bibliographies) according to different citation styles viz. Citeulike, Connotea, Zotero, Mendeley, EndNote (web-base) etc. With this tools author can redirect to library book shelves or electronic libraries in his/her own field anywhere, anytime globally. According to Alun Salt, It's not the 99% of work you already know about that gives an online bibliography its value. It's the 1% added by someone working on the same problem in another field that changes your work. Tags can do the hard work of finding relevant research in other disciplines," Alan (2011). Some social citation tools are given in the figure 2.

Fig. 2: Social Citation Tools
(Source: http://wiki.bath.ac.uk/download/attachments/.../SocialCitation.pdf, Cope (2011).)

Comparison of Social Citation Software's

There are various software's available to use different aspects. Each has their own merits and demerits. A comparative view about these has been summarized in table 1.

Types	Social Citation Softwares					
	Citeulike	Connotea	Mendeley	Zotero	Ref Works	End Note web
Developer	Oversity Limited	Nature Publishing Group	Mendeley	Center for History and New Media at GMU	RefWorks	Thomson Reuters
First public release	Nov. 2004	Dec. 2004	Aug. 2008	Oct. 2006	2001	1988
Latest stable version	?	2006-02-01 (1.7.1)	2012-03-06 (1.5.2)	2012-07-26 (3.0.8.1)	2010-05	2012 (X6)
Cost	Free	Free	US$4.99-99+ per month / Free "Earth" account	Free (100 MB storage) /Additional storage space available ($20/year -> 1GB)	US$100 per year	US $ 299.95
Open Source	No	Yes	No	Yes	No	No
License	Proprietary	GPL	Proprietary OS API clients exist)	AGPL	Proprietary	Proprietary
Notes	Centrally-hosted website	Centrally-hosted website, web-based	Desktop & Web components, iPhone and iPad	Firefox extension or stand-alone with connectors for Chrome and Safari	Centrally-hosted website	Includes End Note Web Account
Operating System						
Windows	N/A	Yes	Yes	Yes	Yes	Yes
Mac OS X	N/A	Yes	Yes	Yes	Yes	Yes
Linux	N/A	Yes	Yes	Yes	N/A	NO
BSD	N/A	Yes	No	Yes	N/A	NO
Unix	N/A	Yes	No	Yes	N/A	NO
Export file formats						
BibTeX	Yes	Yes	Yes	Yes	Yes	Yes
Endnote/Refer/ BibIX	No	Yes	Yes	Yes	No	Yes
Medline	No	No	No	No	No	Yes
MODS XML	No	Yes	No	Yes	No	No
RIS	Yes	Yes	Yes	Yes	Yes	Yes
Other	CoinS, Delicious	RDF	Endnote XML	RDF, TEI, Wikipedia citation templates	Various	Various
Import File Formats						
BibTeX	Yes	Yes	Yes	Yes	Yes	No

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	No	No	No	No	Yes	No
Copac	No	No	No	No	Yes	No
CSA	No	Yes	Yes	Yes	Yes	Yes
Endnote/Refer/BibIX	No	Yes	No	Yes	Yes	Yes
ISI	No	No	No	No	Yes	No
Medline	No	Yes	No	Yes	No	Yes
MODS XML	No	No	No	Partial	Yes	Yes
Ovid	No	No	No	Yes	Yes	Yes
PubMed	Yes	Yes	Yes	Yes	Yes	Yes
RIS	No	No	No	No	Yes	Yes
SciFinder	None	Firefox Bookmarks	Browser Bookmarks	Coins, MARC RDF, Unapi, Browser Bookmarks	Various	Various
Other						
Citation styles						
APA	Yes	?	Yes	Yes	Yes	Yes
Chicago/ Turabian	Yes	?	Yes	Yes	Yes	Yes
Harvard	Yes	?	Yes	Yes	Yes	Yes
MLA	Yes	?	Yes	Yes	Yes	Yes
Other	various	?	1600+ styles	1600+ styles	various	5316
Extension method	None	?	csl	csl	Refworks format through gui	Endnote format (through gui)
Reference List File Formats						
HTML	Yes	N/A	Yes	Yes	Partial	Yes
LaTeX	No	N/A	No	No	No	No
RTF	Yes	N/A	Yes	Yes	Yes	Yes
Plain text	Yes	N/A	Yes	No	Yes	Yes
RSS	Yes	Yes	Yes	Yes	Yes	No
Other	PDF	N/A	clipboard, embeddable HTML widget, RSS	clipboard	DOC, ODT	clipboard, XML
Word Processor Integration						
Microsoft Word	No	No	Yes	Yes	Yes	Yes
OpenOffice.org / LibreOffice	No	No	Yes	Yes	No	Yes
Kile/LyX	No	No	No	with LyZ	No	No
RTF scan	No	No	?	Yes	Yes	Yes
Other	None	None	NeoOffice	NeoOffice, Google docs, pages	None	Apple pages 09
Database connectivity						
ArXiv	Yes	Yes	Yes	Yes	No	Yes
CiteSeer	Yes	Yes	Yes	Yes	No	No
IEEE Xplore	Yes	No	Yes	Yes	No	Yes
PubMed	Yes	Yes	Yes	Yes	Yes	Yes
Other	various	Various	various	various	various	Various , Z39.50
Password "protection" and network versions						
Password	Yes	Yes	Yes	Yes	Yes	Yes
Net-working: User-specific permissions	No	?	Yes	Yes	?	Yes
Net-working: Simultaneous write access	Yes	Yes	Yes	Yes	Yes	Yes

Table 1: Comparison of Social Citation Software's

Source: http://en.wikipedia.org/wiki/Comparison_of_reference_management_software

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LISc professionals are custodian/ manager of knowledge as well as match maker between producer and users of information. They helps the authors directly concern with reporting, referencing, reference sources and citations and also about their reference as per journal styles, use of different tools e.g. Citeulike, Connotea, Mendeley, Zotero, Refwork and Web EndNote. Based on quality and subject of the article LISc professionals also suggest about the more relevant journals, where an author can publish there paper. This includes relevance's with subject; impact factor of journal quality of proper to the sent etc. in the changing scenario, the LISc professionals has to enhance their roles by becoming a member of related SC tools. They can create its own communities within organization and upload all institutional / research papers published by faculty members using the citation software and classified with keywords and disseminate the latest information to global community. They can plan and provide services viz. bibliographies, abstracts and reference information services by designing the knowledge information system services through SC tools. Since, LISc professionals are well trained doing their academic as well as working period for catalogue, classification, indexing, abstracting and importantly referencing. They know about the pattern, style and rules of referencing. Consequently, they are the first to use various citation patterns, and follow by training uses to their readers.

SUGGESTION

Article summaries the various usages of SC and suggests for benefits of the authors and other concerns. LISc professionals should be create awareness of social citation (SC) tools among the users and organized training programmes, such as demonstrations, seminars.

CONCLUSION

It can be concluded that SC is a very important tool especially for scientific writings and its communications. It supports the study to have attracted in the development of particular subjects or especially even narrower branch of it. It's solves many problems of conflicts, frauds and falsification in scientific writing. It also supports to have to share with other researchers working in the same field in a group rather than individual. It also connects the people who have common or similar interest. It is not possible to anyone to be a specialist in all the aspects of his/her discipline. But he/she can follow same one else whose interest overlaps with his/her. Consequently, it has become imperative to use SC in our day today life.

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Open Access Journals in Animal Sciences: An Analytical Study of DOAJ

Sonia Bansal and Nirmal Singh

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Assistant Librarian
Guru Angad Dev Veterinary & Animal Sciences University, Ludhiana

Corresponding Author
Sonia Bansal
soniapta@gmail.com

ABSTRACT

The open access has reformed the information accessibility and utilization. It benefits the interested persons by providing visibility to the authors and information without any charges to those who need information and knowledge. Directory of Open Access Journals (DOAJ) is the significant contribution to the open access movement. It facilitates access to more than 7700 journals in various subjects including 106 journals in the subject of Animal Sciences. Animal Sciences is an important subject related to the health care of livestock. This paper evaluates the contribution of various countries, in various languages to the DOAJ in the subject of Animal Sciences.

KeyTerms: DOAJ, Open Access, Animal Sciences.

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INTRODUCTION

The invention of the internet has brought the world very closer. Open access is the greatest accomplishment of the internet. It has not only supplemented but also revolutionized the information accessibility. Open access has benefited all the sectors of society including researchers and institutions, utmost. It has proved to be more rewarding for the contributors, by providing more visibility and utilization of their contributions. It has significant contribution towards bridging up the gap between information rich and information poor societies.

Open access journals are not only significant sources of information, but also help to prevent the duplication of research work. These provide universal access to the original ideas and research findings. Open access journals are those which are freely available to the public on the internet. These can not only be accessed but can be downloaded, printed, distributed. As open access resources can be accessed by anybody from anywhere over the internet, these provide requisite appeal to the ideas of contributors. The Directory defines open access journals as 'Journals that use a funding model that does not charge readers or their institutions for access' DOAJ (2012a).

Budapest Open Access Initiative, (2012) definition characterises the open access literature as 'free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself.

BENEFITS OF OPEN ACCESS

- More visibility of the contributors
- Avoids duplication of research work
- Instant accessibility
- No financial burden on individuals and institutions
- Maximum use of the ideas of contributors
- Almost no legal or technical barriers to access

DOAJ

DOAJ is one of the greatest outputs of the open access movement. The idea of creating a comprehensive Directory of Open Access Journals to support the global research and education community was discussed for the first time at the First Nordic Conference on Scholarly Communication in Lund/Copenhagen. The Directory is hosted, maintained and partly funded by Lund University Libraries Head Office. It is comprehensive, covering all open access scientific and scholarly journals in all languages, using quality control system to ensure the quality of the contents. It provides single window open access to scholarly journals/ articles in various disciplines. In 2002, DOAJ was providing access to only 33 periodicals, but now it facilitates access to more than 7700 journals from 117 countries, DOAJ (2012b). India occupies 5th position in terms of number of open access journals being contributed to DOAJ.

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OBJECTIVES

The present study is undertaken with an objective to:

- To assess the language wise contribution
- To assess the country wise contribution
- To assess year wise contribution

SCOPE AND METHODOLOGY

The study is restricted to the DOAJ only. The Directory was accessed to get study related data. The data is tabulated and analyzed to get better understanding of the various facets under study. Percentage calculations have been used for interpretation of data.

ANALYSIS AND INTERPRETATION

The DOAJ provides Open Access to 106 journals in the subject of Animal Sciences. The data is tabulated and analysed below:

Table 1: Language Wise Distribution

Languages	No. of E- Journals	%age
English	98	92.45
Spanish	23	21.70
Portuguese	17	16.04
French	4	3.77
Indonesian	3	2.83
Turkish	3	2.83
Italian	2	1.89
Arabic	1	0.94
Bulgarian	1	0.94
Croatian	1	0.94
Dutch	1	0.94
Estonian	1	0.94
Hebrew	1	0.94
Slovenian	1	0.94
Persian	1	0.94

Note: Some of the journals are available in multiple languages.

Language wise interpretation of the journals in the subject of Animal Sciences reveals that 92.45% of the journals are published in English language. The Spanish occupies second position. Whereas, only one journal is published in each of the Arabic, Bulgarian, Croatian, Dutch, Estonian, Hebrew, Slovenian and Persian languages.

Table 2: Country Wise Distribution

Country	No. of E- Journals	%age
Brazil	13	12.26
Romania	7	6.60
UK	6	5.67
United States	6	5.67
Pakistan	6	5.67
Colombia	6	5.67
Japan	5	4.72
Venezuela	5	4.72
Italy	4	3.77
Indonesia	4	3.77
Iran	4	3.77
Argentina	3	2.83
Turkey	3	2.83
Mexico	3	2.83
Slovenia	2	1.89
Serbia	2	1.89
Czech Republic	2	1.89
Spain	2	1.89
Bangladesh	2	1.89
Egypt	2	1.89
India	2	1.89
South Africa	2	1.89
Estonia	1	0.94
Poland	1	0.94
Chile	1	0.94
Iraq	1	0.94
Bulgaria	1	0.94
Israel	1	0.94
Canada	1	0.94
South Korea	1	0.94
Sri Lanka	1	0.94
Croatia	1	0.94
Libya	1	0.94
Germany	1	0.94
Norway	1	0.94
Peru	1	0.94
Belgium	1	0.94
Total	106	100

Table 2 depicts that Brazil is contributing maximum 12.26% ... the DOAJ in the subject of Animal Science followed by Roma... Each of the United Kingdom, United States, Colombia ...

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Pakistan are contributing 5.67% of the total open access journals in Animal Sciences accessible through DOAJ. Japan and Venezuela have share of 4.72% each. India is contributing 1.89% to open access journals. Above table and discussion reveals that Brazil is the dominant contributor to the Open Access journals in Animal Sciences in DOAJ.

Table 3: Year Wise Distribution

Year	No. of E-Journals	%age
1975-1999	28	26.41
2000	7	6.60
2001	8	7.55
2002	7	6.60
2003	5	4.72
2004	6	5.66
2005	9	8.49
2006	5	4.72
2007	2	1.89
2008	5	4.72
2009	7	6.60
2010	6	5.66
2011	11	10.38
Total	106	100

It is obvious from the above table that 28 journals were added to DOAJ during 1975-1999. In the year 2000, 2002 and 2009 only 7 journals per year were added to DOAJ, only 2 journal were added to DOAJ in the year 2007 and 11 journals were added in year 2011.

CONCLUSION

The open access movement has revolutionised the information accessibility and utilization. It is gaining more and more attention day by day. The present study reveals that DOAJ facilitates access to 106 open access journals in the subject of Animal Sciences. English language is most popular in international scenario as 92.45% of the journals are published in English. Brazil dominates other countries in terms of number of journals contributed. With the utilization of advanced Information and Communication Technologies the open access movement is getting more and more attention.

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Use and Usage of Information Sources and Services in T. S. Central State Library, Chandigarh: A User Study

Suman Lata* and Sanjeev Sharma**

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*Research Scholar
**Assistant Professor
DLIS, Kurukshetra University, Kurukshetra

Corresponding Author
Suman Lata
sumansh_latal@yahoo.com

ABSTRACT

Public library being a social institution always strives to meet the informational, educational and recreational needs of the community by providing collection and services. Maximum utilization of library resources and services by the users is the main motive of a public library. The present study is an attempt to know the usage of information sources and services by the T. S. Central State Library of Chandigarh users. A questionnaire was used to identify the impressions of users towards the use and awareness of library services, adequacy of library resources and their views on library services. This paper also examines the satisfaction levels of users about the library collection. Further an attempt has also been made to highlight the findings of the study and a few suggestions have been given based on the analysis of collected data.

KeyTerms: Usage of Sources and Services, Information Sources, Information Services, Central State Library, Public library, User Study

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INTRODUCTION

Information is an important and key resource for every organization and is an essential input for all types of organizations. Libraries are organized information centers as they have limited resources with which they have to satisfy the information needs of the users. Hence, libraries have to build their collections and services to meet user's satisfaction, Tamrakar et.al. (2010). Public libraries are social institutions offering services based upon books and information for various public groups on social, political, economic, cultural and other matters. Among the different types of libraries evolved by the society in modern times, public libraries are the most popular because of the functions they perform. They play a significant role in the welfare of the society, Handa (2011). Public libraries provide information and knowledge freely to its users. Public libraries accessible for all, regardless of age, race, sex, relation, nationality, language or social status, Deswal (2010).

LITERATURE REVIEW

Tamrakar et.al. (2010), conducted a study on use of information sources and services by the research scholars of CDRI library, Lucknow and found that 38.94% of research scholars were using the library daily, 45.26% devoted one to two hour in the library, 75.78% visited the library for borrowing books/ journals, 68.42% of research scholars' purpose of seeking information was to solve immediate practical problems related to their research work, 66.31% of research scholars were using online databases/ journals on the basis of top priority, Borrowing service has been given top priority. Biradar et.al. (2009) studied the use of information sources and services by the students in the Library of Agriculture Science College, Shimoga. The findings of the study reveal that 77.22% of respondents visited the library every day. About 88% of the students visited library to read journals and magazines followed by visits to borrow books 87.12%. It was also found that large numbers of users preferred to use books. As far as usefulness of periodicals was concerned users opined that the Indian Journal of Agriculture Science 62.92% and Karnataka Journal of Agriculture Science 60.67% were the most useful journals. Kumar et.al. (2009) carried out a user study of information resources and services of National Science Library (NSL). The findings reveals that 27.91% of the users visited the library several times in a week, 61.79% users spent two to three hours in the library, and 63.88% users' purpose of library visit was to consult reference material. 69.95% of the users opined about the reading material satisfactory. Meenakshi (2007), studied the use and usage of information resources in government college libraries of Chandigarh. Majority of respondents visited the library with the study/research purpose and to locate information, to borrow books and to access the Internet. Most of the users were not satisfied with the library services and available information resources. Verma et.al. (2007), studied the use of collection and services of Technical Information and Resource Centre of Defense Research and Development Establishment, Gwalior. They determined the need and purpose of using collection and services offered by the Library. They have also suggested some

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suitable recommendations to improve the collection and services for the benefit of users.

T. S. CENTRAL STATE LIBRARY, CHANDIGARH

The Central State Library was established in 1955, under the scheme of Govt. of India, promote art and culture. The liberal grants by the Chandigarh Administration have helped the library grow rapidly to fulfill the divergent demands of the readers. The Central State Library is a beehive of intellectual activities. Since its very inception it has carved a niche for itself in academic, literary and social circles of city beautiful. The library has a regular flow of visitors representing a cross-section of the populace of this region. Bibliophiles have a special affinity for it, as the latest books are the earliest to reach this library. The library has given a positive thrust to book-culture and related activities. Central State Library caters to the demand of northern sectors and villages of the Chandigarh with a network of two branches, and a mobile van. This library network development has given a new impetus to book culture. People have free access to the quintessential reading material virtually at their doorstep.

The library is organized in various sections; these are Acquisition Section, Reference Section, Circulation Section, Children Section, Periodical Section, Newspaper Section, Binding Section, Administrative Section, Rare Book Section, Section for Physically handicaps and Blinds. The functioning of the library is fully computerized using LIBSYS software.

OBJECTIVES

The specific objectives of the study are:

- To know the users' frequency and purpose of visiting the library
- To find out the time spend by the users in the library
- To find out type of information sources frequently used by the users
- To know the satisfaction level of users with the library collection
- To find out the library services frequently used by the users
- To know the opinion of users with the present library services
- To suggest the ways and means for the improvement of the library services

RESEARCH METHODOLOGY

To achieve the objectives of the study, survey method of research was adopted. A structured questionnaire was designed and used for collecting data from the users of the T. S. Central State Library, Chandigarh. 100 questionnaires were personally distributed among the users of the library on random basis, out of which 95 users responded to the questionnaire.

SCOPE AND LIMITATIONS

The scope of the present study is confined only to the library users visiting T. S. Central State Library personally, which comprises students, govt. employees, non- govt. employees, unemployed and senior citizens etc. The study population is limited to 95 users of the T. S. Central State Library.

ANALYSIS & INTERPRETATION

The views of the users were elicited through questionnaires. Questionnaires were analysed and their results have been presented in the following tables and figures:

❑ Occupation/ Category Wise Distribution of Respondents

Table 1: Category Wise Distribution

Category	Respondents	%age
Students	39	41.05
Govt. Employee	16	16.84
Non-Govt. Employee	14	14.74
Unemployed	19	20
Senior Citizen	7	7.37
Total	95	100

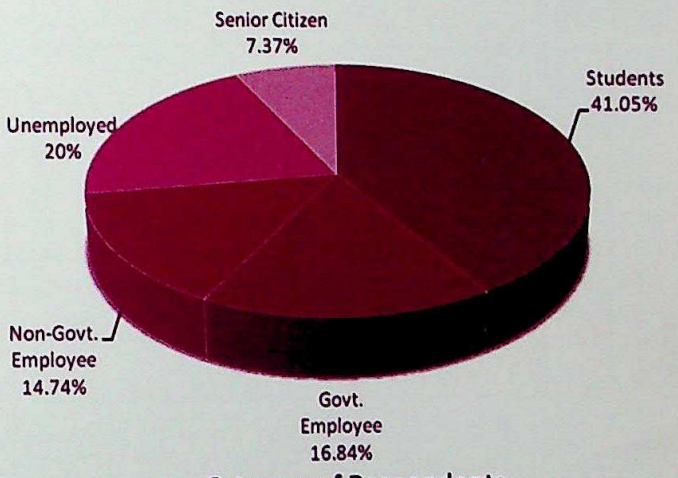

Fig.1: Category of Respondents

Above table and figure depicts the occupation of respondents. Among 95 users, 39(41.05%) were students, 16(16.84%) were employed in government departments, 14(14.74%) were employed in non-government departments, 19(20%) were unemployed and 7(7.37%) were senior citizens.

❑ Gender wise Distribution of Respondents

Table 2: Gender wise Distribution

Gender	Respondents	%age
Male	59	62.11
Female	36	37.89
Total	95	100

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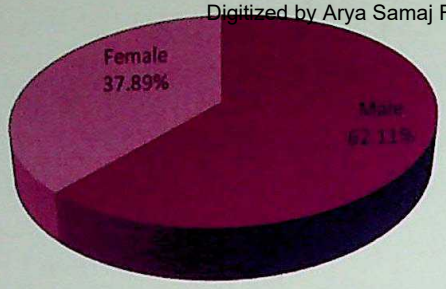


Gender of Respondents

Fig.2: Gender of Respondents

Table and figure 2 exhibits that among 95 respondents, there were 59 male users against 36 female users. They represent 62.11% and 37.89% respectively. Thus it is observed that male users were more than female users.

❑ **Frequency of Library Visit**

Table 3: Frequency of Library Visit

Frequency	Users	%age
Daily	27	28.42
Once a week	15	15.79
Twice a week	21	22.10
Fortnightly	14	14.74
Once a month	8	8.42
Occasionally	10	10.53
Total	95	100

Table 3 reveals that 27(28.42%) users visited the library daily, 15(15.79%) users visited library once in a week, 21(22.10%) users visited the library twice in a week, 14(14.74%) fortnightly and 10(10.53%) users visited the library occasionally, whereas only 8(8.42%) users visited the library once in a month.

❑ **Time Spend in Library**

Table 4: Time Spend in Library

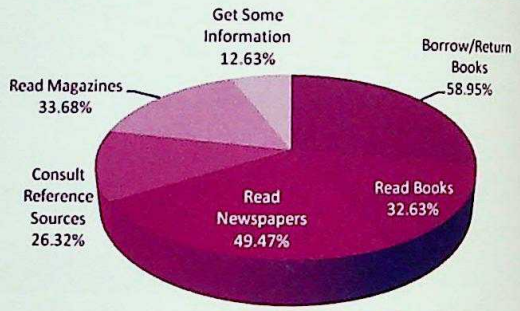
Hours	Users	%age
Less than one hour	09	9.47
One hour	07	7.37
Two hours	12	12.63
Three hours	10	10.53
More than three hours	38	40
More than six hours	16	16.84
Others	03	3.15

Table 4 demonstrates that out of 95 respondents, 38(40%) spent more than three hours in the library, 16(16.84%) spent more than six hours, 12(12.63%) users spent two hours, 10(10.53%) spent three hours, 7(7.37%) users spent one hour while 9(9.47%) spent less than one hour and only 3(3.15%) users spent whole day in the library.

❑ **Purpose of Visiting the Library**

Table 5: Purpose of Visiting the Library

Purpose	Visitors	%age
Borrow/Return Books	56	58.95
Read Books	31	32.63
Read Newspapers	47	49.47
Consult Reference Sources	25	26.32
Read Magazines	32	33.68
Get Some Information	12	12.63
Internet Access	32	33.68



Number of Visitors

Figure 3: Purpose of Visiting the Library

Table 5 and figure 3 exhibits that majority of users i.e. 56(58.95%) visited the library for borrow/return books, 47(49.47%) users for reading newspapers. 32(33.68%) users visited the library for reading magazines & accessing Internet while 25(26.32%) for consulting reference sources, 31(32.63%) users visited the library for reading books and only 12(12.63%) for getting some information.

❑ **Frequently Consulted Information Sources**

Table 6: Frequently Consulted Sources

Sources	Respondents	%age
Reference Sources	59	62.10
Non Fiction	50	52.63
Fiction	48	50.53
Magazines	49	51.57
Newspapers	57	60
Govt. publications	20	21.05
Internet	58	61.05
Audio visual	21	22.10

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Table 6 shows that majority of the users i.e. 59(62.10%) frequently used reference sources. 58(61.05), 57(60.00%), 50(52.63%), 49(51.57%) and 48(50.53%) users frequently used Internet, Newspapers, Non-fiction, Magazines, and Fiction respectively. 21(22.10%) users frequently used audio visual material while only 20(21.05%) users frequently used government publications.

❑ Users' Satisfaction Level and Library Collection

Table 7: Users' Satisfaction Level and Library Collection

Library Collection	Satisfaction Level			Not used	Total
	Satisfied	Neutral	Dissatisfied		
Reference Sources	33 (34.73%)	25 (26.31%)	22 (23.15%)	15 (15.78%)	95 (100%)
Non Fiction	44 (46.32%)	28 (29.47%)	23 (24.21%)	-	95 (100%)
Fiction	25 (26.31%)	35 (36.84%)	24 (25.26%)	11 (11.57%)	95 (100%)
Magazines	36 (37.89%)	31 (32.63%)	17 (17.89%)	11 (11.57%)	95 (100%)
Newspapers	38 (40%)	44 (46.32%)	9 (9.47%)	04 (4.21%)	95 (100%)
Govt. publications	38 (40%)	26 (27.36%)	18 (18.94%)	13 (13.68%)	95 (100%)
CD-ROMs/ DVDs	22 (23.15%)	30 (31.57%)	28 (29.47%)	15 (15.78%)	95 (100%)

Table 7 depicts that maximum number of users i.e. 44(46.32%) were fully satisfied with the Non-fiction. 36(37.89%), 33(34.73%), and 25(26.31%), were fully satisfied with the Magazines, Reference Sources and Fiction respectively. 38(40%) were fully satisfied with both Newspapers and Government publications available in the library. Only 22(23.15%) were satisfied with the Audio Visual material i.e. CD-ROMs/DVDs available in the library.

❑ Frequently used Library Services

Table 8: Frequently used Library Services

Library Services	Respondents	%age
Circulation Service	61	64.21
Book Reservation Service	33	34.73
Reference Service	56	58.95
Reprography Service	47	49.48
Internet Access	58	61.05

Table 8 shows that majority of the users i.e. 61(64.21%), 58(61.05), 56(58.95%) and 47(49.48%) users frequently used Circulation Service, Internet, Reference Service and Reprography Service respectively. Only 33(34.74%) users frequently used Books Reservation Service.

❑ Users' Satisfaction Level and Library Services

Table 9: Users' Satisfaction Level and Library Services

Library Services	Satisfaction Level			Not used	Total
	Satisfied	Neutral	Dissatisfied		
Circulation Service	52 (54.73%)	26 (27.36%)	17 (17.89%)	-	95 (100%)
Book Reservation Service	20 (21.05%)	35 (36.84%)	11 (11.57%)	29 (30.52%)	95 (100%)
Reference Service	26 (27.36%)	43 (45.26%)	6 (6.31%)	20 (21.05%)	95 (100%)
Reprography Service	43 (45.26%)	37 (38.94%)	10 (10.52%)	5 (5.56%)	95 (100%)
Internet Access	49 (51.58%)	24 (25.26%)	12 (12.63%)	10 (10.52%)	95 (100%)

Table 9 reveals that maximum number of users i.e. 52(54.73%) were fully satisfied, 26(27.36%) neutral and 17(17.89%) dissatisfied with the circulation service provided by the library. 20(21.05%), 35(36.84%) and 11(11.57%) were satisfied, neutral and dissatisfied respectively with the book reservation service while 29(30.52%) never taken advantage of this service as they were not aware of the availability of such service in the library. 26(27.36%) were satisfied, 43(45.26%) neutral, 6(6.31%) dissatisfied with the reference service and 20(21.05%) users never utilized this service. Most of the users 43(45.26%) were satisfied, 37(38.94%) neutral and 10(10.52%) dissatisfied with the reprographic service while only 5(5.56%) users never felt need of this services and thus never used by them. 49(51.58%), 24(25.26%) and 12(12.63%) users were satisfied, neutral and dissatisfied respectively with the Internet access provided by the library whereas 10(10.52%) users never used this facility.

FINDINGS

The major findings of the study are:

- 27(28.42%) users visited the library daily. 15(15.79%), 21(22.10%), 14(14.74%) and 10(10.53%) users visited library once in a week, twice in a week, fortnightly and occasionally respectively while only 8(8.42%) users visited the library once in a month.
- 38(40%) users spent more than three hours in the library, 16(16.84%) spent more than six hours and only 3(3.15%) users spent whole day in the library.
- Majority of users i.e. 56(58.95%) visited the library to borrow/return books, 47(49.47%) users for reading newspapers. 32(33.68%), 31(32.63%) and only 12(12.63%) users visited the library for reading magazines & accessing Internet, reading books and for getting some information respectively.
- Most of the users 61(64.21%), 58(61.05), 56(58.95%) and 47(49.48%) users frequently used Circulation

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Service, Internet, Reference Service and Reprography Service respectively. Only 33(34.74%) users frequently used Books Reservation Service.

- Maximum number of users 52(54.73%) were fully satisfied with the Circulation Service provided by the library. 20(21.05%) satisfied with the Book Reservation Service. 26(27.36%) were satisfied with the Reference Service. Most of the users 43 (45.26%) were satisfied with the Reprographic Service and 49(51.58%) users were satisfied with the Internet access provided by the library.
- 59(62.10%) frequently use reference sources, 58(61.05), 57(60.00%). 50(52.63%), 49(51.57%) and 48(50.53%) users frequently use Internet, Newspapers, Non-fiction, Magazines, and Fiction respectively.
- 44(46.32%) were fully satisfied with the Non-fiction. 36(37.89%), 33(34.73%), and 25(26.31%), were fully satisfied with the Magazines, Reference Sources and Fiction respectively. 38(40%) were fully satisfied with both Newspapers and Government publications available in the library. Only 22(23.15%) were satisfied with the Audio Visual material i.e. CD-ROMs/DVDs available in the library.

SUGGESTIONS MADE BY USERS

- Reading material should be arranged in proper order for easy accessibility.
- The timings of the library should be extended up to 9:00 PM.
- Books related to Medical Science and Law (Legal books and dictionaries), Latest competition/UPSC examination books, NCERT basic books should be added in the library collection. Books on Geography, Economics and Political science, general reading and general knowledge should be improved.
- E-books and E-journals should be made available in the library.
- Audio Visual Material i.e. CD-ROMs/DVDs should be increased.
- More computers should be added for Internet access.
- Magazines related to competitive examination should be increased in quantity.
- There should be separate reading room for reading personal books.
- Sitting capacity in reading rooms, magazine section, newspaper section and reference section should be increased.

SUGGESTIONS AND CONCLUSION

A majority of users visit the library daily with the study purpose, borrow books, to read newspapers, to prepare for competitive examination and to access Internet. It is, therefore suggested that more and latest books, periodicals/magazines and other printed and non printed material should be added in the library so as to meet the requirements of the users. Most of the users are not aware of services provided in the library. Thus, it is be suggested that proper user education or library orientation programmes should be provided to the users. From time to time user studies may also be carried out in order to know the needs of users, the existing status and strength & weakness of library services with the intention to improve the existing situation and/or to provide the better services to users.

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Information Seeking Behaviour of Faculty of Chitkara University (Punjab): A Case Study

Nirmal Singh* and Mamta Rani**

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*Assistant Librarian
Guru Angad Dev Veterinary & Animal Sciences University, Ludhiana
**Librarian
College of Education
Chitkara University, Rajpura

Corresponding Author
Nirmal Singh
nirmal02@yahoo.co.in

ABSTRACT

Information needs and information seeking behaviour have been of interest to Library and Information Science Professionals (LISPs) for facilitating quality and customized library and information services to users. The analysis of information seeking behaviour and preferences of users allow the LISPs to design and develop the library and information services according to users' needs. The present paper provides an insight into the information seeking behaviour of the faculty of University. The faculty's purpose of seeking information, sources of information, preferred place of accessing information, use of search engines, etc. have been examined. The influence of the Information and Communication Technologies (ICTs) over the information seeking behaviour of teachers has been explored. The problems faced by faculty members in gathering information have also been discussed.

KeyTerms: Information Seeking Behaviour, Information Use Pattern, Information Needs, E- Resources.

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INTRODUCTION

Information seeking behavior has been focus of research for facilitating quality and customized library services to users. The analysis of information seeking behaviour and preferences of users enables the Library and Information Science Professionals (LISPs) to design and develop the library and information services accordingly. Knowledge of reasons and motivation why people seek information and the types of information they seek can impact "collection development, reference services, programming, and budget allotment practices", Agosto et.al. (2005).

The advent and applications of Information and Communication Technologies (ICTs) have given birth to the new formats of information resources and new channels of communicating information. These have changed the connotation of libraries and have given birth to the concepts of digital and hybrid libraries. At the same time, these have influenced the information needs and information gathering habits of users. The Internet, especially the World Wide Web has emerged as a globally accepted source of information. Results from web information-seeking studies can assist LIS professionals in knowledge representation, the design of web sites and portals, in the development of training and web-based information retrieval systems, the design and administration of online education, electronic Customer Relationship Management and electronic service quality, Fourie (2006). In changing information landscape, provision of right information to the right users at the right time has become more complex. Therefore, understanding information seeking behavior of users is imperative for improving the existing information system and for designing and developing new information services for meeting up the information needs of users.

Chitkara institution began its journey from Engineering and Technology (affiliated with Punjab Technical University, Jalandhar) founded in 2002. After serving in academic spheres for eight years, this got the status of university. The library and information system of university facilitates Online Public Access Catalogue (OPAC), access to online journals and databases of Delnet, Interlibrary loan etc.

OBJECTIVES

Objectives of the study are listed below:

- To find out the faculty's purpose of seeking information.
- To ascertain the sources of information for faculty and what resources do they use to access information.
- To find out the faculty's preference for electronic and print information resources.
- To examine the influence of ICTs on the information seeking behaviour of teachers.
- To reveal the extent of satisfaction of teachers with the resources and services of respective college libraries.
- To find out the problems faced by faculty in gathering information.

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METHODOLOGY

To ascertain the information seeking behavior of faculty, a survey was conducted using questionnaire. The questionnaire was prepared after review of relevant literature and a pilot study was conducted to streamline the questions. There are seven constituent colleges in University having total 242 faculty members. Purposive sampling method was used to select a sample of 100 teachers. Copies of questionnaire were personally administered to the faculty and were also collected back in person. The term faculty and teachers have been used interchangeably. Percentage calculations have been made for analyzing the responses. The data has been presented in figures.

REVIEW OF LITERATURE

Review of few selective and useful studies is given here:

Pareek et.al. (2013) explored the information seeking behavior and library use pattern of researchers in the Banasthali University. Open and close ended questionnaire was used to know opinion of researchers. Study brought forward that researchers visit library frequently for accomplishing research, to study and borrow reading material. The research guides, central library and the Internet were found to be the most reliable sources for seeking information. Study concluded with the need for a plan to promote effective utilization of library sources and services. A joint study was conducted by, Aforo et.al. (2012) to examine the information needs and the information seeking behavior of law lecturers in Kwame Nkrumah University of Science and Technology, Ghana. Study disclosed 68.8% of lecturers sought for information daily. The lecturers have diverse information needs for which they rely heavily on law reports, law journals and textbooks. Study found a positive correlation between adequacy of library resources and frequency of lecturer's visits to library. Similarly sharma et.al. (2012) conducted a study of information seeking behaviour of faculty members at Sher-e-Kashmir University of Agricultural Sciences and Technology, Jammu. Authors revealed that faculty members preferred to use the Internet for seeking information on respective subjects and the use of the internet has influenced the usage of print resources.

Bellary (2011) brought forward that books, periodicals and newspapers are the most used information resources for meeting information needs of faculty. Faculty members seek information mainly for preparing lectures and to keep themselves up-to-date. Lakshmi et.al. (2011) say that libraries need to understand the information-seeking behavior of users for improving their services for meeting up information needs of users efficiently. In a study of information seeking behavior of faculty of Islamia University of Bahawalpur, Bhatti (2009), revealed that majority of the faculty members use library resources for teaching. Colleagues are the primary sources of information for more than half of the teachers. Respective offices and homes are preferred places for academic and research work. Rafiq et.al. (2009) conducted a joint study to examine the information-seeking behavior of teachers of the National Textile University, Pakistan. It has been found that books are the most preferred sources of information followed by communication with colleagues and use of journal articles. The Internet and email are highly used electronic services. Another study was executed by Thanuskodi (2009) to examine the information needs and information seeking behavior of law faculty at Law College. Findings revealed that faculty used various sources of information for teaching and research purposes. Among these books and law reports were considered most important. Though, teachers supposed library as an effective source for meeting up their information needs, they still preferred to consult their personal collection first.

Umbur (2008) disclosed that being sources of current and authentic information to researchers, journals were the most used sources of information. It was concluded that the proper utilization of information sources and services will improve the research output. Barik et.al. (2007) found that electronic sources are the primary source for gathering information by the scientist and research scholar. Electronic journals are the most preferred electronic resources. Workplace is most preferred location for accessing e-resources. Khongtim (2006), conducted a review of literature to examine the pattern of information seeking behavior on the Internet. Study concluded that most of the users use the Internet as a best source for seeking information. In a study to examine the information seeking behaviour of faculty members of six Rajabhat Universities in Bangkok, Patitungkho et.al. (200 divulged that 53% faculty members consult knowledgeable person in the field for seeking information. Preparing class lectures is the major purpose for gathering information and the books and journals are the most used sources for seeking information. Likewise, Shokeen et.al. (2003) examined the information seeking behaviour of psychologists and sociologists of six universities in Delhi and Haryana. The study brought forward that about 1/4th (25.27%) respondents were visiting libraries daily. Browsing was found to be the preferred method to find needed information. Another study was carried out by Mc et.al. (2001), revealing that the faculty are aware of, and utilize new information technology to support their research.

DISCUSSION AND ANALYSIS

Out of 100 questionnaires administered to faculty, 85 were received back as complete and relevant for analysis. About 54.11% of the respondents comprised of female faculty and remaining 45.89% comprised of male teachers. More than 3/4th of the respondents 77.64% had masters' degrees in concerned subjects and 12.94% had bachelors' degrees. Four respondents were Doctorate and other four had Master of Philosophy degrees in respective disciplines. Experience of faculty ranged between months to 38 years.

❑ Academic Status

It is evident from figure 1 that majority of the respondents 85.89% comprised of Assistant Professors. Nearly 10.59% faculty members were serving as Associate Professors and remaining 03.52% respondents had the status of Professors.

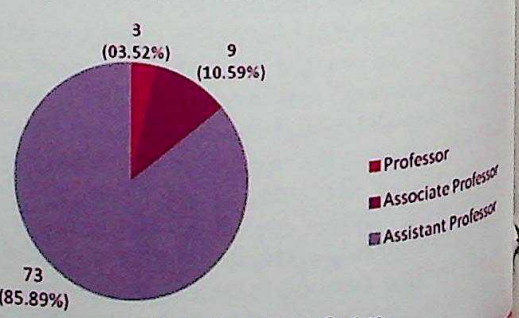

Fig.1: Academic Status

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Purpose of Seeking Information

Figure 2 shows that 82.35% of the faculty members seek information to keep themselves up to date with the current developments taking place in respective disciplines. About 56.47% teachers seek information for research purpose. Around 55.29% respondents seek information to prepare class lectures. It has been found that 15.29% teachers seek information to spend leisure time.

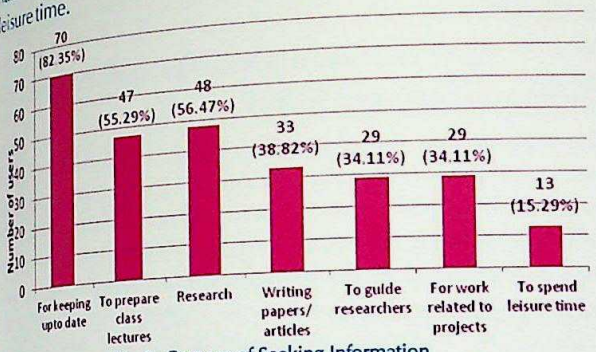

Fig. 2 : Purpose of Seeking Information

Sources of Information

The ICTs have greatly influenced the information seeking behavior of users. Nearly 98.82% teachers use the Internet to access information for various purposes. This supports the study of, Khongtim (2006). About 82.35% respondents seek information from libraries of respective colleges. Around 48.23% faculty members discuss with colleagues to enhance their knowledge in concerned subjects. One of the respondents also seeks information from television and another has maintained and is updating her personal library to satisfy the information curiosity from time to time.

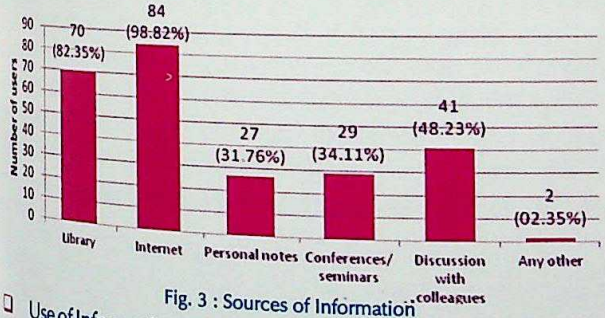

Fig. 3 : Sources of Information

Use of Information Resources

As depicts in figure 4 majority of the teachers forming 83.52% seek information from books for meeting their needs. This advocates the findings of the study of, Rafiq et.al.(2009). Nearly 64.70% use e-books. It has been found that e-journals are more used than print journals. About 54.11% faculty members read newspapers for meeting information needs. Around 4.70% teachers apply RSS feeds to get information updates.

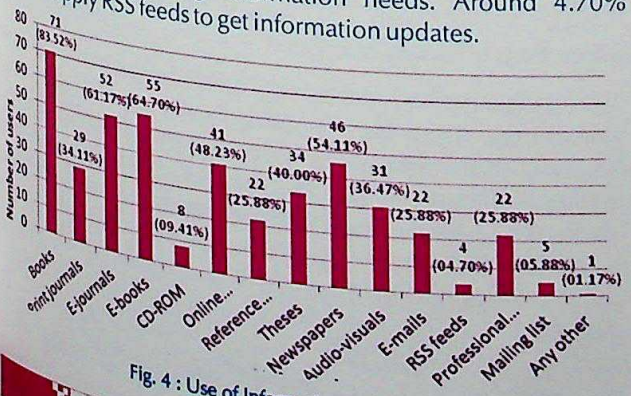

Fig. 4 : Use of Information Resources

Use of E-Journals

Figure 5 makes it clear that majority of the users (62.35%) utilise open access journals available in the public domain. About 35.29% faculty members use e-journals to which their respective libraries provide access.

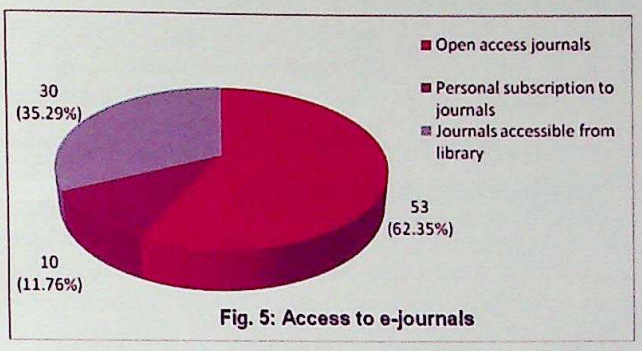

Fig. 5: Access to e-journals

Preference Over Print v/s E-Journals

It is clear from figure 6 that more than 3/4th of the faculty members 76.47% like to use both print and e-resources to access information. Around 14.11% teachers prefer to use e-resources to satisfy their information needs, whereas 9.41% prefer to use print information resources over electronic resources.

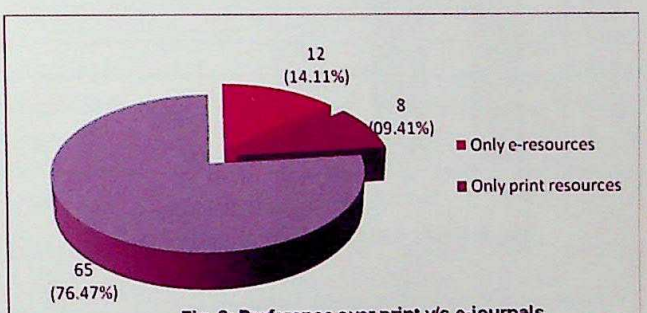

Fig. 6: Preference over print v/s e-journals

Place of Accessing Information

As revealed by figure 7, a majority forming 62.35% respondents access e-journals from their home. Nearly 55.29% faculty members find it convenient to access e-journals from respective departments. Two-fifth of the users access e-journals from libraries of concerned colleges. A few teachers visit computer centres/ computer labs to access e-resources.

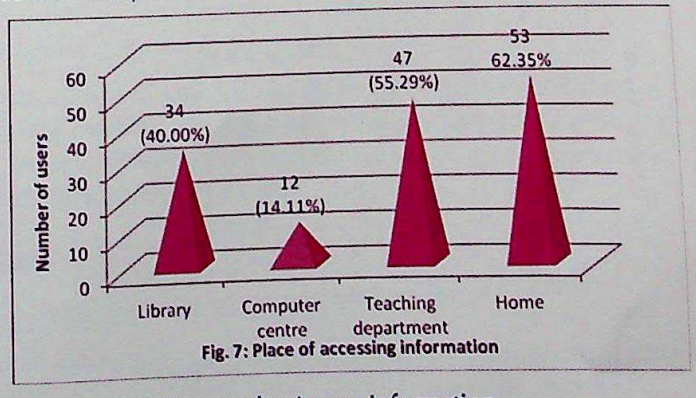

Fig. 7: Place of accessing information

Search Engines used to Access Information

The Google is the most widely used search engines to access information as shown in figure 8. In addition 14.11% teachers use yahoo and 5.88% use MSN for seeking information. Lycos and Ask Jeeves are used by one teacher each.

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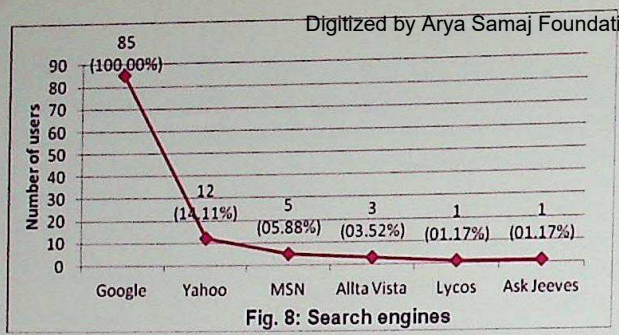

Fig. 8: Search engines

Time Spent for Gathering Information

Figure 9 reveals that more than one third of the users 37.64% spent 6 to 10 hours per week for gathering information from various information sources. Around 29.41% faculty members spent up to 5 hours for collecting information. On the other hand 5.88% teachers spent more than 20 hours weekly for gathering information.

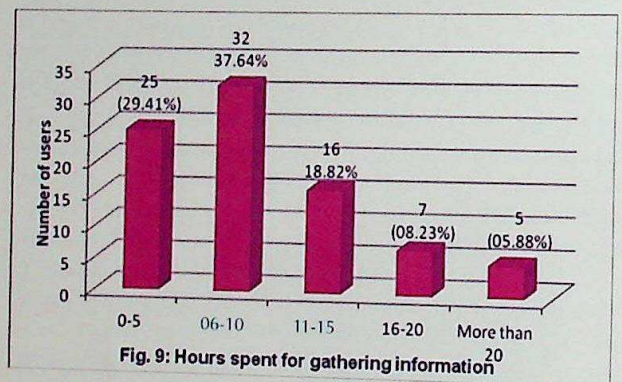

Fig. 9: Hours spent for gathering information

Number of Articles Accessed Per Week

It has been found that majority of the faculty members collect up to 5 articles per week on an average. Nearly 23.52% respondents gather 6-10 articles weekly from various sources. Four teachers responded that they collect more than 20 articles/ paper per week on an average.

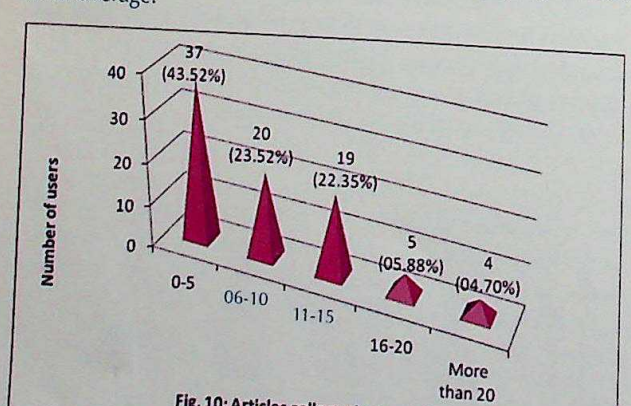

Fig. 10: Articles collected per week

Satisfaction with Library and Information System

Figure 11 discloses that 48.23% teachers expressed partial satisfaction with library and information system of the university. About 41.18% faculty members were satisfied whereas remaining 10.59% were not satisfied with the resources and services of libraries of respective colleges of the university system

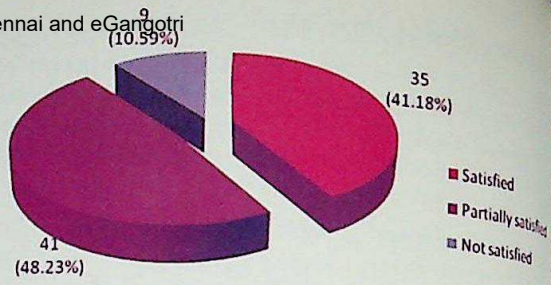

Fig. 11: Satisfaction with library & information system

Open Access Information Sources

There are various sources of information in different disciplines freely available over the Internet. About 62.36% teachers find these freely available information resources useful in meeting their information needs. The remaining 37.64% faculty members rate these as highly useful in satisfying their information needs.

Orientation Programmme

Orientation/ initiation to users is the inaguaral point for promoting use of library and information system of an institution. It was disappointing to find that 78.82% faculty members did not get orientation from the library staff for utilizing the information resrources and services. The remaing 21.18% teachers accepted that they got orientation from library staff for making optimum use of information resources.

Impact of ICT

The use of ICTs have changed the way people access and use information. These have placed the information at users' desktop which can be accessed any time 24x7. About 91.77% faculty members accepted that ICTs have changed their information seeking beahvaiour. On the other hand remaining 8.23% were of the view that ICTs have not influenced their information seeking behaviour. It is important to note that these 7 teachers were not using e-resources for meeting up their information needs.

Problems Faced by Users in Accessing Information

Lack of sufficient time for gathering information is the major problem encountered by 47.05% faculty. Teachers remain busy in teaching and other academic activities and find it difficult to spare time for seeking information from different information resources. Nearly 15.29% teachers expressed that sometimes they do not get required information from libraries vis-à-vis Internet. Around 9.41% faculty members feel information overload. Four respondents bluntly shared that they were reluctant in using ICT tools and techniques for accessing information from e-resources.

Suggestions of Faculty Members

The faculty members of different colleges of the university made various suggestions for improving the library and information system of the university. Teachers suggested for increasing the timings of libraries so that they can use libraries after teaching hours. One of them said that the library services should be accessible 24x7. Nearly 21.18% teachers grumbled the lack of adequate number of journals and suggested for 'regular' subscription to reputed national and international journals particularly e-journals. Teachers suggested for subscription to the journals of Science Direct, Springer, IEEE and ACM, etc. One of

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the respondents added that "Library should subscribe to the e-journals with respectable impact factor." A user said that library should have books in Indian context, whereas another added that there should be sufficient number of reference books for consultation. While a few users suggested for improving the physical facilities of respective libraries, a teacher put forward that they should be regularly informed by library staff about the new arrivals in libraries. One of the respondents added that computers provided in libraries are not upgraded regularly to keep pace with the changing technology which needs immediate attention. A faculty member made suggestion for increasing the number of books for competitive examinations. Another suggested for provision of software for statistical analysis (SPSS, Capital Line, etc.) in libraries.

CONCLUSION

It is concluded that majority of the faculty members seek information from different sources for updating themselves with the current developments in concerned disciplines and for research work. The ICTs, particularly the Internet have made a significant impact over information seeking behavior of teachers. Around 98.82% faculty members make use of the Internet to access information. About 91.77% faculty members accepted that ICTs have influenced their information seeking beahvaiour. But, this has not lessened the significance of libraries. Nearly 82.35% teachers seek information from libraries of respective institutions. A careful observation of responses reveals that teachers of Engineering College use respective library more frequently than faculty of other colleges. As compared to female, male teachers are regular visitors to concerned libraries. Books are the most widely used sources of information followed by use of e-journals. The subscription to journals (both print and e-journals) needs serious attention. To keep pace with the changing scenario and keeping in view the opinion of teachers, subscription to online journals may be increased as compared to print journals. Google is the most widely used search engine. Majority of the teachers were partially satisfied with the libraries of concerned institutions. Strengtheining collection, introducing advanced library services, and orientation to faculty members could be useful venture in promoting the use of libraries. Library and Information Science Professionals can play a significant role in developing information literacy skills among faculty.

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Research Publication Trends among Physicists of the Indian Institute of Science and the University of Kerala: A Bibliometric Study

K.G. Pillai Sudhier

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Librarian
School of Distance Education,
University of Kerala
Seanet House Campus,
Thiruvananthapuram, Kerala

Corresponding Author
K.G. Pillai Sudhier
kgsudhier@gmail.com

ABSTRACT

The bibliometric study analysed the research productivity of physicists at the Indian Institute of Science (IISc) and the University of Kerala (KU) during 2004-2008. The paper gives a summary and review of the various research evaluation studies of institutions and disciplines. There were 352 research articles listed in the Physics doctoral theses of both the institutions, including 267 from the IISc and 85 from the KU. The authorship trend is towards multi-authored papers in IISc and solo research is predominant in the KU The degree of collaboration of publication was calculated to be 0.94 in IISc researchers and 0.40 in the case of the KU. Journals are the most preferred channel of publication of IISc researchers while KU researchers prefer to publish their research findings mostly in national seminars. The study shows that the Phys. Rev. B tops the list of IISc physicists' choice of journals for publication with 15 publications (9.58%). The KU researchers prefer to publish their research results mostly in Indian journal of Radio and Space Physics with 10 articles 25.64%. Elsevier Science publisher is the most common publisher preferred by the Physicists of both institutions.

KeyTerms: Bibliometrics, Research Publications, Physicists, Indian Institute of Science, University of Kerala, Authorship Study, Doctoral Thesis.

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INTRODUCTION

Physics research in India is basically an institutional activity, pursued countrywide with funding coming from several sectors including academic, R & D, government and industry. The academic sector constitutes universities, institutions of higher learning, and colleges. There are nearly 435 Physics based research institutions in the country employing more than 5000 Ph.Ds and several thousands masters' engaged in research programmes in the major areas of Physics. A large number of universities are engaged in post graduate teaching and research and doctoral programmes. As a result, around 7000 PhDs are awarded each year in Physics, Dhawan et.al. (2007). Even though Physics institutions are spread throughout India, the research activity in Physics is confined mainly to select few institutions only in the country. According to Boyer (1973), the research process is incomplete if the research results are not used or not made readily accessible to the potentially interested researchers. These institutions are regarded as R & D leaders in this area. The Indian Institute of Science (IISc), Bangalore comes under this category of institution.

Bibliometrics is emerged as a research front in its own right in information science. It is now being vigorously pursued and with the result, it has been found that one-fourth of all the articles published in Library and Information Science periodicals are on bibliometrics and its related topics. It has also been found that many of the Social Science and Science periodicals are also carrying a large number of articles on Bibliometrics, Maheswarappa (1997). Bibliometrics is a set of methods used to study or measure texts and information. Citation analysis and content analysis are commonly used bibliometric methods. While bibliometric methods are most often used in the field of library and information science, bibliometrics have many applications in other areas. In fact, many research fields use bibliometric methods to explore the impact of their field, the impact of a set of researchers, or the impact of a particular paper. Bibliometrics are now used in quantitative research assessment exercises of academic output which is starting to threaten practice based research.

Indian Institute of Science (IISc) is particularly selected for comparison because of its national importance as a Centre of Excellence in Physics. The World Education report ranks this Bangalore based institute as the 18th best academic centre of the world. Since it emerged out of Jamshed Ji Tata's vision in 1909, it has grown into an advanced research and education centre and, indeed, a premier 'brain trust' of the country. IISc has celebrated its centenary

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its centenary in 2009. Its character, which blends the ambience of a University with the advantage of a research institution, has helped IISc to maintain a steady level of academic performance. The Department of Physics established by the Nobel laureate Sir. C.V. Raman in 1933 is the oldest division of Physical and Mathematical Sciences. Since 1998 the largest number 110 PhDs in Physics in India come from this department.

University of Kerala, which occupies the position of the mother university in the state, has been at the centre of all higher education activity in Kerala since its very inception. The University of Travancore which eventually became the University of Kerala was established in 1937 by a promulgation of the Maharaja of Travancore Sri Chithira Tirunal Balarama Varma, was transferred in to the present name in 1957. The Department of Physics was formally established in 1970 by Prof. K. S. Viswanathan.

In the present study an attempt has been made to study the scholarly research contributions of the physicists of IISc and KU during the period of their research and the lists are included in their doctoral dissertations. Dissertations are current, impartial reviews with extensive references and most of them contains list of research publications of the researchers and the supervising teachers. Cito analytical studies of doctoral dissertations, which are the products of research activity, form an important source of information.

REVIEW OF LITERATURE

A number of quantitative studies based on bibliometric/ scientometric techniques have been reported to evaluate the research productivity of individuals, institutions, countries etc. Bibliometric studies based on dissertations have been carried out in India and abroad, in order to understand the pattern of materials used by the scientists for their research purposes in different branches of science during the last two decades.

Chandra Arya (2012), studied the authorship pattern and collaborative research trends in the field of Veterinary Medicine based on the data collected from Indian journal of Veterinary Medicine. Sudhier et.al. (2011) analysed the research productivity of social scientists at the Centre for development Studies, Trivandrum during 1998-2008. There were 599 research articles published by the CDS researchers. Jeyshankar et.al. (2011) analysed bibliographical details of 1282 research articles published by the scientists of CECRI during the period 2000-2009. Sahu et.al. (2011), studied the research publication trend of National Metallurgical Laboratory during the year 2001- 2010 based on the data obtained from Science Citation Index (SCI).

Nandi et.al. (2010) studied research productivity in Zoology by analysing 719 articles submitted by the scholars of the Zoology Department of the University of Burdwan. Bala et.al. (2010), in their study attempted to analyse the research profile of biochemistry, genetics and molecular biology research in India during 1998-2007. Sudhier (2010), in his scientometric study analysed the publications of Physics researchers at the Indian Institute of Science.

Scientometric analysis of 67 theses and 610 articles (based on theses submitted by the scholars during 1960-2000 in the Dept. of Physics at the University of Burdwan) scattered in 8 subdivisions of Physics were analysed by Nandi et.al. (2009). Bala et.al. (2009), studied the research output of Govt. Medical College and Hospital, Chandigarh. Girap et.al. (2009) in their scientometric study analysed the publication productivity of the Technical Physics and Prototype Engineering Division at Bhabha Atomic Research Centre. Research articles published by the scientists of central Potato research Institute, Shimla during 1991-2007 were studied by Sharma (2009).

The impact and growth of research output of the various departments of the University of Mysore during 1996-2006 was conducted by Kumbar et.al. (2008). Sevukan et.al. (2008), presented a detailed analysis of research performance of Biotechnology faculties in central universities of India from 1997-2006. Scientometric analysis of 1044 papers published by the scientists of Radiochemistry Division at Bhabha Atomic Research Centre (BARC) during 1958-2005 was done by, Kademani et.al. (2007). Sudhier (2007) studied 690 journal citations collected from the doctoral theses of IISc during five year period and was observed that journals are the most frequently bibliographic form of citations.

Gopikuttan (2004) in his scientometric study dealt with the research output in terms of journal articles, reports, books etc produced by the teachers of Science Departments, Faculty of Science, University of Kerala between 1980 and 1999 (20 Years). Jeevan et.al. (2002) in their scientometric study analysed the research profile of IIT, Kharagpur. Soman (2001) as part of his doctoral research programme, attempted to assess the scientific information productivity of physical scientists in the universities in Kerala, and to find out the factors that affect the scientific information productivity and to examine the role of information technology in augmenting the scientific productivity of the physical scientists.

Garg et.al. (1998) made a scientometric analysis of the publication data of the scientists of an Indian Physics laboratory (New Delhi). Authors found that the scientists preferred to publish their communications in foreign journals included in the SCI. Sangam et.al. (1997), studied the trends in Physics research publication and institutions wise contribution to the Physics research publications by analysing the research publications reported in Indian Science Abstract.

Even though several studies have done to study the scientific productivity of scientists in the country, no studies have been made for the comparative evaluation of the research contributions of physicists of two institutions based on the publications included in the doctoral dissertations. Hence this study is carried out.

OBJECTIVES

The main purpose of the study is to examine the publication productivity of physicists of IISc and KU during the period 2004-08 as indicated in the doctoral dissertations. The objectives include:

- To study the research publication productivity of Physicists
- To ascertain the authorship and collaboration pattern of researchers
- To examine the communication channels preferred by the Physicists

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- To prepare a rank list of journals preferred for publication
- To find out country wise distribution of journals

METHODOLOGY

Bibliometric analysis of 352 scholarly publications appended in the Physics doctoral thesis of researchers of IISc and KU, are collected for the five years period. Out of 352 publications, 267 are from the IISc and 85 from the KU doctoral theses. All the bibliographic details of publications were collected and analysed based on the bibliometric techniques like publication productivity, authorship trend, ranked journals, and communication channels preferred etc. as per the objectives of the study.

ANALYSIS AND DISCUSSIONS

Number of Publications

A comparative analysis of number of publications included in the doctoral dissertations of IISc and the University of Kerala physicists are included in the table 1.

Table 1: Number of Publications

Publications	IISc		KU		Total	
	Count	%age	Count	%age	Count	%age
Nil	39	54.9	1	8.3	40	48.2
1-5	6	8.5	3	25.0	9	10.9
6-10	18	25.4	6	50.0	24	28.9
11-15	8	11.2	2	16.7	10	12.0
Total	71	100	12	100	83	100

It is observed that 39 (54.9%) researchers of IISc do not include the list of publications in their theses. Whereas in the University of Kerala, almost of thesis 11 include the list of publications except one. The highest number of thesis 25.4% are having 6-10 publications and 6 theses have 1-5 numbers of publications in IISc theses. While 6 thesis 50% have 6-10 range of publications and three theses have 1-5 range of publications in the case of KU.

Average Number of Publications

Table 2 shows the comparison of average number of publications per theses of the two institutions.

Table 2: Average Number of Publications

Institution	Mean	SD	t	p
IISc	3.7	4.7	2.50	p<0.01
KU	6.8	3.6		

The average number of publication per theses in IISc is 3.7 with a Standard Deviation (SD) 4.7 and the average number of publication per thesis in KU is 6.8 with a SD 3.6. The t -statistics is 2.5 with a p value less than 0.01. It means that the average number of publications per thesis is statistically high in KU compared to IISc. This may because of the non inclusion of list of publications of IISc researchers in their theses.

Year wise Distribution of Average Number of Publications

The table 3 shows the year wise comparison of average number of publications of IISc and KU scholars during the period of study.

Table 3: Year Wise Analysis of Average Number of Publications

Institutions	Year	Mean	SD	F	P
IISc	2004	3.4	5.0	0.7	p>0.05
	2005	3.2	3.6		
	2006	5.2	4.9		
	2007	2.5	4.1		
	2008	3.3	5.5		
KU	2005	6.7	1.2	2.8	p>0.05
	2007	4.0	3.3		
	2008	9.0	3.7		

In the case of IISc, the average number of publication is high 5.2 in 2006 with standard deviation 4.9 and a minimum 2.5 in 2007 with standard deviation 4.1. The F-value is 0.7 with a p value greater than 0.05. It means that, statistically there is no significance in the number of publication in different years.

While in the KU, the average number of publications is maximum (9.0) in 2008 with standard deviation 3.7 and a minimum 4.0 in 2007 with standard deviation 3.3. The F-value is 2.8 with a p value greater than 0.05. It also shows the year wise analysis is statistically insignificant. The analysis also revealed that, no theses were awarded during the years 2004 and 2006.

Gender wise Productivity of Research Publications

Table 4 shows the gender-wise distribution of publications of physicists of the two institutions

Table 4: Gender-Wise Analysis of Research Publications

Year	IISc		KU		Total
	Male	Female	Male	Female	
2004	61	11	0	0	72
2005	33	2	15	6	56
2006	75	30	0	0	105
2007	18	7	0	17	42
2008	16	14	32	15	77
Total	203	64	47	38	352

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In Table 4, out of the 267 publications of IISc scholars, majority of 203 publications are the contributions of male scholars and 64 are of female scholars. This is because of the dominance of male researchers of IISc. While in KU, the scene is different. Even though the theses productivity of female scholars are more than that of males, the productivity of research publications are more for male scholars. It is seen from the analysis that the contributions of male scholars are 45 publications, where as female scholars contribute 36 articles during the period.

Gender-wise Average Number of Publication Productivity

Comparative analysis of average number of publications of male and female scholars is shown in Table 5.

Table 5: Gender Wise Analysis of Average Number of Publications

Institutions	Sex	Mean	SD	t	P
IISc	Male	3.9	4.6	0.41	p>0.05
	Female	3.4	4.9		
KU	Male	9.0	3.5	2.07	p>0.05
	Female	5.1	3.0		

The analysis shows that the average number of publications of male scholars of IISc is 3.9 with standard deviation 4.6 and that of female scholars is 3.4 with a standard deviation 0.49 with a p value greater than 0.05. It shows that the difference of average number of publication of male and female scholars of IISc is statistically not significant. While in the KU, the average number of publications of male scholars is 9.0 with a standard deviation 3.5 and for female scholars it is 5.1 with a standard deviation of 3.0. The t-statistics is 2.07 with a p value greater than 0.05. It also shows that comparison is statistically insignificant.

Authorship Pattern of Publications

Table 6: Authorship Pattern of Publications

Authors	IISc		KU		Chi-square	P
	Count	%age	Count	%age		
1	16	5.99	51	60.0	134.13	p<0.01
2	55	20.60	19	22.4		
3	42	15.73	7	8.2		
4	59	22.10	3	3.5		
5+	95	35.58	5	5.9		
Total	267	100	85	100		

The authorship trend is towards multi-authored papers in IISc and solo research is predominant in the KU. In IISc, single authored papers account for 5.99% (16) followed by two authored papers 20.60% (55) and three authored papers 15.73% (42). The trend is different in the University of Kerala. Single authored papers account for 60% (51) and the remaining 40% (34) are multi-authored, of which 22.4% (19) are joint authorship papers.

Chi-Square test is applied to the data and the value of ?2 is found to be 134.13 with a p-value less than 0.01, which is highly significant. The Chi- square test proves the difference of authorship pattern of two institutions is statistically significant.

Average Number of Authors of Publications

Table 7: Average Number of Authors of Publications

Institutions	Mean	SD	n	t	Sig.
IISc	4.0	2.1	267	12.66	0.00
KU	1.7	1.1	85		

Table 7 depicts the average number of authors per article of IISc researches is found to be 4 and it is 1.7 in the KU. The result of the t-test is 12.66 at 0.00 significance level and it indicates that the average number of authors per article of IISc researchers is significantly very high. The result indicates that the publications of IISc researchers are multi-authored papers compared to the publications of K researchers. Hence the result is statistically significant.

Degree of Collaboration of Publications

Table 8: Degree of Collaboration of Publications

IISc			KU		
Single Authors	Multiple Authors	Degree of Collaboration	Single Authors	Multiple Authors	Degree of Collaboration
16	251	0.94	51	34	0.40

The table 8 indicates that 251 (94%) of the publication of IISc researchers are multi-authored and only 16 (6%) are single contribution. The degree of collaboration is calculated as 0.94. The results of the analysis show that collaborative results are prevalent in IISc Physics labs. While 51 (60%) publications of the KU researchers are single authored contributions and the remaining 34 (40%) are multi-authored publications. The degree of collaboration is estimated as 0.40. In this case single authored publications are more, and therefore solo research may be prominent in Department of Physics, University of Kerala.

Communication Channels Preferred for Publication

Table 9: Channels of Publications of Physicists

Category	IISc		KU	
	Count	%age	Count	%age
Journals	131	49.1	20	23.5
Communicated	53	19.9	19	22.4
International Seminars	30	11.2	6	7.1
National Seminars	27	10.1	37	43.4
Manuscripts	23	8.6	0	0
Technical Reports	2	0.7	0	0
Books	1	0.4	2	2.4
Patent	0	0	1	1.2
Total	267	100	85	100

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As depicts in the table 9 the journals are the most preferred channel of publication of IISc scholars and it amounts 49.1% (131) of all publications. 19.9% (53) articles are in the form of communicated category and are not published yet. The international seminar category accounts 11.2% (30) and only 1 (0.4%) publication is in the form of book. It is interesting to see that patents are not in the publication list. KU scholars prefer to publish their research findings in national seminars and it accounts 43.4% (37) of total publications. The second position goes to the journals 23.5% and communicated category accounts 22.4% (19). The technical report's and manuscripts are not included in the publication list.

Choice of Journals for Publication

From the previous analysis it can be seen that table 9 the journals are the most preferred channel of publication of IISc scholars 49% and in the University of Kerala it occupies the second position with 23.5% of total publications. The rank list of the most preferred journals by the Physicists of IISc are presented in the table 10. The journals preferred more than 4 times are included in the table 10.

Table 10: Ranked Journals for Publication (IISc)

Journal	Country*	Rank	Count	%age	Cum %	IF**
Phys.Rev.B	USA	1	16	9.58	9.58	3.075
J.Crystal Growth	Netherland	2	8	4.79	14.37	1.707
J.Phys-Condensed Matter	UK	2	8	4.79	19.16	2.049
Liq.Cryst.	UK	3	7	4.19	23.35	
Solid State Commun.	UK	3	7	4.19	27.54	1.523
Phys.Rev. Lett.	USA	4	6	3.59	31.14	7.218
App.Phys. Lett.	USA	5	5	2.99	34.13	4.308
Bull.of Astron Soc.	India	5	5	2.99	37.13	
Chem.Phys. Lett	Netherland	5	5	2.99	40.12	2.438
Euro.Phys. Lett.	France	5	5	2.99	43.11	2.120
J.Appl. Phys.	USA	5	5	2.99	46.11	2.255
Acta Cryst.	Denmark	6	4	2.40	48.50	1.829
Astro. and Astorphys.	France	6	4	2.40	50.90	3.694
Astrophy-sical J.	USA	6	4	2.40	53.29	6.237
Mon.Not. Roy. Astr.Soc.	UK	6	4	2.40	55.69	5.238
Phys.Rev.A	USA	6	4	2.40	58.08	2.902

* Data from Ulrich ** Data from JCR-2008

In the rank list, the Phys.Rev. B published by the America Physical Society (APS), tops with the highest contribution of (9.58%) publications followed by Journal of crystal growth a Journal of Physics Condensed matter with 8 publications each hold the second position 4.79%. Liquid crystals and Solid st communication with seven publications 4.19% each occupi third position. The choice of journals preferred for publicatio by the scholars of University of Kerala are shown in the table 11.

Table 11: Ranked List of Journals for Publication (KU)

Journal	Country*	Rank	Count	%age	Cum %	IF**
Ind. J. of Radio & Space Phys.	India	1	10	25.64	25.64	
J.Am.Ceram. Soc.	USA	2	4	10.26	35.90	0.401
Ind.J.of Phys.	India	3	3	7.69	43.59	
Spectrochim Acta, Part A	UK	3	3	7.69	51.28	1.188
U.Sci.Phyl. Sci.	France	3	3	7.69	58.97	
Ind.J.Pure. Appl.Phys.	India	4	2	5.13	64.10	0.088
Proc.Ind. Acad.Sci.	India	4	2	5.13	69.23	

* Data from Ulrich ** Data from JCR-200

The journals preferred more than two times are given in the Tabl 11. Indian Jl. of Radio and Space Physics published by the CSI scores the top with 10 articles 25.64%, followed by Journal o American Ceramic society with 4 (10.26%) publications. The journals, Indian Jl. of Physics, Spectrochin Act Part A and Ultr Sci. Phy. Science occupies the 3rd position with 3 (7.69%) article each.

Country Wise Distribution of Journals

Table 12: Country Wise Distribution of Journals (IISc)

Country	Rank	Count	%age	Cum %
USA	1	66	43.42	43.42
UK	2	38	25	68.42
Netherland	3	19	12.50	80.92
India	4	10	6.58	87.50
Germany	5	6	3.95	91.45
France	6	5	3.29	94.74
Swiss	6	5	3.29	98.03
Denmark	7	2	1.31	99.34
Singapore	8	1	0.66	100
	Total	152	100	

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The analysis shows that USA, UK, Netherlands and India retain the first, second, third and fourth position in the ranking order respectively with 66 (43.42%), 38 (25%), 19 (12.5%) and 10 (6.58%) publications.

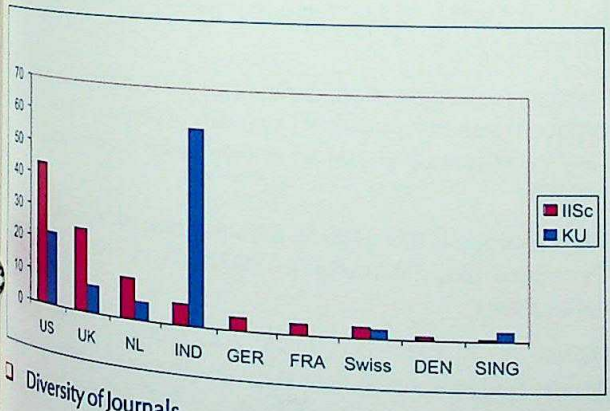
Table 13: Country Wise Distribution of Journals (KU)

Country	Rank	Count	%age	Cum %
India	1	21	58.3	58.33
USA	2	8	22.2	80.56
UK	3	3	8.3	88.89
Netherland	4	2	5.6	94.44
Singapore	5	1	2.8	97.22
Swiss	5	1	2.8	100
	Total	36	100	

While in the University of Kerala the rank order is different. India retains the first position carrying 21 publications 58.3% followed by USA with 8 publications 22.2% and UK with 3 publications 8.3%.

Country of Origin

The bar diagram showing the country of origin of journals are shown in the Figure 1. It can be clearly seen that the KU scholars mostly preferred Indian journals and American journals are the most preferred journals of IISc researchers.



Diversity of Journals

Table 14: Language Wise Distribution of Journals

Language	IISc		KU	
	Count	% age	Count	%age
English	138	90.79	35	94.6
Dutch	13	8.55	2	5.4
French	1	0.66	0	0.0
Total	152	100	37	100

The study shows that English is the most widely used medium of correspondence for publication of Physicists of both institutions. While 138 (90.79%) publications of IISc scholars are in English, 35 (94.6%) publications of University of Kerala scholars prefers English. 8.55% of IISc publications are in Dutch language journals and 5.4% publications of KU scholars prefer it. The analysis also shows that one article of IISc scholar is in French journals.

Preferred Publishers

Table 15: Publishers of Journals (IISc)

Publisher	Rank	Count	%age	Cum %
APS	1	27	17.65	17.65
Elsevier Science	2	16	10.46	28.10
AIP	3	13	8.50	36.60
North Holland	3	13	8.50	45.10
IOP	4	11	7.19	52.29
AAS	5	7	4.58	56.86
Taylor & Francis	5	7	4.58	61.44
Academic Press	6	5	3.27	64.71
EDP Science	6	5	3.27	67.97
IAS	6	5	3.27	71.24
Kluwer	6	5	3.27	74.51
Wiley-VCH	6	5	3.27	77.78

The table 15 indicates that, the IISc scholars prefer to publish their articles in American Physical Society (APS) journals with 27 (17.65%) publications followed by Elsevier Science publishers with 16(10.46%) publications. This is followed by American Institute of Physics (AIP) and North-Holland comes in the third position with 13 publications 8.5% each.

Table 16: Publishers of Journals (KU)

Publisher	Rank	Count	%age	Cum %
CSIR	1	12	34.3	34.29
ACS	2	4	11.4	45.71
Elsevier Science	3	3	8.6	54.29
IACS	3	3	8.6	62.86
Kluwer	3	3	8.6	71.43
Pergamon	3	3	8.6	80.00
NAS	4	2	5.7	85.71

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The Physicists of the KU prefer to publish their articles in CSIR journals, as seen in the table 16. It amounts 12 (34.3%) of the total publishers of journals. American Chemical Society (ACS) with 4 publications 11.4% comes second position and the following four publishers with 3 articles 8.60% shares the third position. They are Elsevier Science, IAC, Kluwer Academic Press, and Pergamon Press.

CONCLUSION

Publication productivity is the measure of the relationship between the output of research and inputs. Evaluating the productivity of an institutional research and development activities highlights the contribution of the institution and the individual scientists engaged in research. It also provides some insights into the complex dynamics of research activity and enables policy makers and administrators to provide adequate facilities and gauge the research activities in a proper direction. Over the years, scientometric and bibliometric techniques have become tools to evaluate the productivity of research institutes and individual researcher, as well as to map the growth of the research area.

There were 352 research articles listed in the Physics doctoral theses of IISc and KU, including 267 from the IISc and 85 from the KU. The average number of publications per theses of IISc theses is 3.7 while it is higher, 6.8 in the University of Kerala. Publications produced by male scholars are predominantly higher than that of female scholars of IISc. The authorship trend is towards multi-authored papers in IISc and solo research is predominant in the University of Kerala. The analysis reveals that the authorship pattern of two institutions is significantly different. The average number of authors per article of IISc researchers is 4 and it is 1.7 in the University of Kerala. The degree of collaboration of publication is calculated to be 0.94 in IISc researchers and 0.40 in the case of the University of Kerala.

Journals are the most preferred channel of publication of IISc researchers while the KU researchers prefer to publish their research findings mostly in seminars. The study shows that the Phys. Rev. B tops the list of IISc physicists choice of journals for publication with 16 publications 9.58%. The KU researchers prefer to publish their research articles mostly in Indian journal of Radio and Space Physics and it publishes 10 articles 25.64%. The publication behaviour of IISc physicists indicates that they are highly selective in publishing their research results in specialised journals with high IF.

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Research Productivity of Medicos at All India Institute of Medical Sciences (AIIMS)

Zahid Ashraf Wani*, Omar Hameed** and Aasif Iqbal**

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*Assistant Professor
**MLIS Student
DLIS, University of Kashmir, Jammu & Kashmir

Corresponding Author
Zahid Ashraf Wani
zahidrais@gmail.com

ABSTRACT

Paper is an endeavor to measure the research contribution of India's leading health care institute AIIMS. Paper dugs deep into decadal growth, subject-wise contribution and national and international collaborations by AIIMS medicos, besides it also makes an attempt to ascertain the citation impact of their research output. The findings shows that subject category Medicine contribute 64.52% of overall output. Likewise decade 1999-2008 is leading with 43.86% publications, while as, decade 1959-1968 contributed least 0.48%. The most cited subject area is Biochemistry, Genetics & Molecular Biology with 16769 citations. Institution has made 973 international and 2450 national collaborations.

KeyTerms: Research Productivity, Research Output, Research Collaboration, Publication Collaboration, Citation.

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INTRODUCTION

Knowledge is the primary and powerful resource that ushers prosperity of a society. New knowledge can be acquired only with the pursuit of research to extend the frontiers of knowledge. It plays an important role in all round development of a country, be it science and technology research or any other filed. With the advancement in the fields of science and technology, research is gaining its pace day by day and Medical Science is one of the leading subjects in this respect. Medical Science is growing in its importance all over the world at an immense pace. Advances in research in the field of medicine and health care inarguably pave way for healthy society and in turn a wealthy society. A sound health care sector in a country can pave way for better treatment, quality patients care and patients from abroad can also get benefited which will have direct impact on the economy of a country and off late has also become one of the sources to earn foreign exchange and help build economy further as medical tourism is becoming a big industry. In this context role All India Institute of Medical Sciences (AIIMS) as a premier medical college and hospital and research institution in India is expected to be the harbinger in pursuing quality research in diverse areas of health science. AIIMS was established as an institute of national importance by an act of the Indian parliament with the objective of developing a strong curriculum and teaching guidelines for undergraduate and post-graduate education in all branches of medicine in India. AIIMS seeks to achieve a high standard of medical education in India and to bring together in one place educational facilities of the highest order so as to attain self-sufficiency in good quality medical education and research.

There are at least 45 super specialties at AIIMS. Having clin... super specialties in the same campus as its major resea... facilities makes AIIMS optimally suited for nurturing best qu... research, which can translate into clinically useful end produ... in India.

SCOPE

The present work explores and analyzes research output of A... by employing well-known indexing database 'Scopus'. The d... has been retrieved from year 1959 to June 2011.

OBJECTIVES

- To explore the research output of AIIMS in diff... subject areas of medicine.
- To assess the publishing trends of researchers in var... subject areas investigated and studied.
- To gauge the volume of collaboration at Natio... International and Institutional level.
- To identify journals in which researcher prefer pub... their findings.
- To analyze the citation pattern of articles published ... researchers.

METHODOLOGY

In order to fulfill the above laid down objectives data ... retrieved from Scopus by giving specific search queries as per ... set objectives. The data as such collected is tabulated, analy... and interpreted to come up with relevant findings.

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REVIEW OF LITERATURE

A good proportion of research has be done on the research contribution of institutions and individuals world over and study made a strenuous effort to delve deep in such studies to ferret out relevant findings and observations for the present study.

Vasista (2011), investigated the contribution & impact of research output on PEC University of technology as reflected in its publications covered in Scopus international multidisciplinary database and described broad characteristics of research publications of PEC during 1996-2009. She concluded that in all 177 research papers were published during 14 years by the nine departments of the PEC showing an average of growth rate of 131.85%. Growth in the academic research output is seen after the PEC has attained a deemed university status. Contribution to engineering and technology literature from this institute is increasing steadily. Jeevan et.al. (2009), study is based on the research publications generated by Structural Engineering Research Centre (SERC) during the years 2002-2006. They collected the data from the annual reports of SERC analysis was based on impact factor provided by journal citation report. They concluded that a small portion of R&D findings in Engineering fields such as structural engineering are documented in non-journal format primary information sources such as proceeding of conferences/workshops/seminars/symposiums. Kumbar et.al. (2008), analyzed the strong and weak areas of university research, their growth rate and impact of research in terms of average citation received and also studied the output and impact of research under different existing subject departments of the university and the collaboration. They concluded that the research activity of university of Mysore in Science and Technology is growing with an average rate of 23% per annum. The analysis was based on publication data consisting of 1518 research papers published by the university from 1996-2006. Prathap et.al. (2009), conducted a survey on research output of engineering colleges of India and they used two different matrices to rank institutions: (a). total no of publications during 1999-2008 and (b). a new metric called the p-index, defined as (c2p)1/3 where c is the number of citations received by the papers during a three year survey immediately after their publication and IISC Bangalore tops the list. Bala et.al. (2009), analyzed the research activities of the government medical college and hospital (GMCH) Chandigarh as reflected in its 16 years period (1992-2007) 754 publications have been covered in Scopus. It focused on publication growth, characteristics, format and media of communication, research impact and quality, patterns of collection, broad and narrow areas of research focus and most cited papers. They concluded that GMCH stands at 9th rank in research output, 13th in average citation per paper and 12th in h-index among the top 15 medical colleges of the country. GMCH has recorded an annual publication growth of 19.79% and impact as measured by average citation per paper as 0.89, although 55.97% of its total papers received one or more citations but only 14 of its papers received 16 and above citation. Only 2-3% of its papers involved international collaboration. Jeevan et.al. (2002) studied the quantitative profile of research in university, with a view to get the idea about the performance and impact of research produced in each department and the comparison of the impact of research in various departments. They concluded that the researchers perform well when they collaborate more both at national and international levels. Okafor et.al. (2010), analyzed the research output of academics in the science and engineering faculties of Federal Government owned universities in Nigeria. They explored their level of research output during 1997-2006 in terms of the publication of journal articles and linked research and publication trends with place of publication and journal title. They collected the data on research output by the questionnaire survey of the academics. Their study revealed that 30.6% of the academics published between 0-4 journals articles, that only 2.7% of them published 30 or more journal articles during the period and as many as 42.1% did not have any article in over sea journals. Singh (2005), studied the research contributions, performance and impact in different fields of science and technology. They concluded that three subjects namely mathematics, biology and clinical medicine although contributing smaller number of papers secured first three ranks in terms average normalized impact per paper. They have fairly a high %age of collaboration papers but badly failed in contributing to high quality papers with the exception of clinical medicine. They also revealed that these three fields have performed the best in terms of publication effectiveness index. Estanol et.al. (2009), analyzed the impact of university industry collaboration on academic research output, in terms of productivity, quality and direction of research and they concluded that researchers with industrial links publish significantly more than their peers. Researchers with no industrial involvement are produced to publish less than those with small degree of collaboration. They also concluded that correcting for the reverse causality of industry collaboration and research output is crucial when trying to estimate the true impact the former on latter. Podobnik et.al. (2008) compared the creation research output with the neighboring countries and the croation universities with the largest Solvenian, Hungarian and Serbian universities. By analyzing European countries, they show a functional dependence between the gross domestic product (GDP) and the research output. From this fact they concluded that creation science exhibits research output as expected for a given level of GD. Genest et.al. (2002) updated the work on world research output in probability and statistics. The ranking were produced of countries and institutions are based on a survey of papers published between 1986 & 2002 in 25 specialized journals of high reputation in these two fields and the contribution of Canadian probabililists and statisticians is highlighted. Gonzalez et.al. (2007) conducted a study and found that there is a quadratic relationship between age and the number of published papers and publishing peaks when researchers are approximately 53 years old. They also suggest that age does not have a substantial influence on research output and impact. They also found that the reputation matters for the number of citations but not the publications and also show important heterogeneity across areas of knowledge. Behzad (2007), performed a bibliomatic search to evaluate the number of papers written by the Iranaian Nephrologists. They concluded that Iran's contribution to the research on kidney disease is not satisfactory in terms of the volume and the quality of publications. Soteriades et.al. (2002) have evaluated all the articles published in different parts of the world in the top 50 Biomedical journals from 1995-2002. A total of 107557 articles indexed in Pub Med were published in the top 50 biomedical journals. They divided the world into nine regions and found that US is by far the highest

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ranking country region in publication in Acta Biomedical journals. He Zilin, et.al.(2009), conducted a longitudinal study of 65 biomedical scientists in a new Zealand university and concluded that collaborative research has been increasingly celebrated by the science community but the hypothesized positive relationship between research collaboration and research output is more assumed than rigorously tested. They coded the collaborative variables by hand checking each of their publications in a period of 14 years. They found that at article level, both within university and international collaboration are positively related to an article's quality and that at scientist year level, only international collaboration is positively related to a scientist's future research output. Bala et.al. (2011) studied the measurement of research productivity of Indian scientists contributing to world soybean research for the period 1989-2008 based on the data available in the International Crop CD database. They concluded that Indian scientists, contributing to world soybean research, have higher publication share. India obtains 2nd rank in world publication on soybean research after USA. They revealed that India has 2nd rank in research publication with 13.64% share in the world. The activity index of India decreases gradually. The growth rate has also decrease gradually and correspondingly doubling time has increase They revealed high degree of collaboration with 93.1 contributions of joint authorship.

ANALYSIS & DISCUSSION

❑ Subject Wise Distribution of Research Output

It is observed in the table 1 that in the subject area of Medic 14381 (64.52%) papers published which is highest followed Biochemistry 2686 (12.05%) & Pharmacology 983 (4.41%) wh as least number of papers are found in Arts and Humanities (0.01%) and for 253 (1.13%) papers subject could not identified therefore tagged as undefined. During 1959-19 medicos published highest number i.e. 55 papers in the field Medicine. With the advancement in 1969-1978, resea contribution in the field of Medicine also showed accelerat with record output 938 followed by Biochemistry 196 a Neuroscience 72. Digitization of documents and adoption of I helped researchers, as it is apparent from the contribution in t subject stream of Medicine total output was 6259, followed Biochemistry 1175 and Pharmacology 506 in the year 19 2008.

Table 1: Subject Wise Distribution of Research Output

Subject Area	Output from the year 1959-2011								
	59-68	69-78	79-88	89-98	99-08	09-11	Output	%age	Rank
Medicine	55	938	1595	3143	6259	2391	14381	64.52	1.
Bio Chem., Genetics & Mol Biology	11	196	285	580	1175	439	2686	12.05	2.
Pharmacology & Toxicology	08	41	82	198	506	148	983	4.41	3.
Neuroscience	10	72	127	145	467	149	970	4.35	4.
Immunology & Microbiology	00	38	112	177	472	107	906	4.06	5.
Agriculture & Biological Science	04	21	49	96	140	27	337	1.51	6.
Health Profession	00	12	15	76	190	18	311	1.39	7.
Physics & Astronomy	00	08	08	37	101	22	176	0.78	8.
Chemical Engineering	00	25	37	35	50	20	167	0.74	9.
Chemistry	00	04	07	21	66	47	145	0.65	10.
Dentistry	00	05	08	16	74	24	127	0.56	11.
Nursing	00	00	05	07	59	51	122	0.54	12.
Social Science	00	03	13	12	59	26	113	0.50	13.
Environmental Science	02	02	17	29	32	15	97	0.43	14.
Psychology	00	05	04	19	48	21	97	0.43	14.
Engineering	00	04	07	24	25	30	90	0.40	15.
Multidisciplinary	14	07	02	20	33	09	85	0.38	16.
Mathematics	01	02	20	30	01	05	59	0.26	17.
Material Science	00	01	01	07	25	17	51	0.22	18.
Decision Science	01	02	16	20	00	00	39	0.17	19.

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Veterinary	00	00	02	04	21	06	33	0.14	20.
Computer Science	00	02	06	06	08	07	29	0.13	21.
Earth,Planetary Science	00	00	02	07	00	01	10	0.04	22.
Business, Mgt & Accounting	00	00	00	01	03	03	07	0.03	23.
Economics & Finance	00	01	0x0	02	03	01	07	0.03	23.
Energy	00	02	00	00	02	00	04	0.01	24.
Arts & Humanities	00	00	00	01	02	00	03	0.01	25.
Undefined	01	00	01	107	141	03	253	1.13	
Total	107	1,391	2,421	4,820	9,962	3,587	22,288		

Note: The actual number of papers is 17181 instead of 22288, as this is due to multidisciplinary nature of papers accommodated into more than one subject area.

Document Type

Table 2: Document Wise Output

Document	Output	% age
Article	12820	74.61
Letter	1424	8.28
Review	1148	6.68
Conference Paper	388	2.25
Editorial	229	1.33
Article in Press	146	0.84
Short Survey	128	0.74
Note	127	0.73
Erratum	28	0.16
Undefined	743	4.32
Total	17,181	100

Table 2 depicts that major portion of research output is published as Research Articles 74.61% followed by Letters 8.28% and Review 6.68%, while as Erratum 0.16% is the least found document type in the study.

Public Collaboration

Table 3: Collaborations at National and International Level

Collaborations	Number	% age
International	973	5.66
National	2,450	14.25
Local Level	13,758	80.09
Total	17,181	100

Table 3 depicts that out of 17181 research papers 973 (5.66%) papers published with International collaboration 2450 (14.25%) papers are having alliances at the National level and 13758 (80.07%) papers were collaborated at local (AIIMS) level.

Collaboration at National Level

Table 4: State Wise Collaboration

Sr. No.	State/Union Territory	Output	% age	Rank
1.	New Delhi	1730	70.61	1.
2.	Uttar Pradesh	193	7.87	2.
3.	Chandigarh	152	6.20	3.
4.	Maharashtra	90	3.67	4.
5.	Karnataka	55	2.24	6.
6.	Tamil Nadu	46	1.87	5.
7.	Kerala	34	1.38	6.
8.	Andhra Pradesh	49	2.0	7.
9.	Punjab	21	0.85	8.
10.	Haryana	24	0.97	9.
11.	West Bengal	14	0.57	10.
12.	Rajasthan	12	0.48	11.
13.	Himachal Pradesh	11	0.44	12.
14.	Jammu and Kashmir	10	0.40	13.
15.	Pudducherry	09	0.36	14.
	Total	2,450	100	

It has been seen in the table 4 that out of 2450 documents New Delhi records highest number of papers 1730 (70.61%), followed by Uttar Pradesh 193(7.87%) & Chandigarh 152 (6.20%), while as Pudducherry 9 (0.36%) has the least collaborations with the researchers of AIIMS.

Collaboration at International Level (Country wise Distribution)

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Table 5: Country Wise Collaboration/ Publications

S. No.	Countries	Number	%age	Rank
1.	United States	405	41.62	1.
2.	Canada	98	10.07	2.
3.	United Kingdom	65	6.68	3.
4.	Switzerland	58	5.96	4.
5.	Australia	37	3.80	5.
6.	Germany	32	3.28	6.
7.	Hong Kong	23	2.36	7.
8.	Brazil	19	1.95	8.
9.	Malaysia	17	1.74	9.
10.	Nepal	17	1.74	9.
11.	Kuwait	15	1.54	10.
12.	Spain	15	1.54	10.
13.	Austria	14	1.43	11.
14.	Belgium	14	1.43	11.
15.	Mexico	14	1.43	11.
16.	Norway	14	1.43	11.
17.	France	13	1.33	12.
18.	Nigeria	13	1.33	12.
19.	Thailand	13	1.33	12.
20.	Saudi Arabia	11	1.13	13.
21.	Lebanon	10	1.02	14.
22.	Columbia	10	1.02	14.
23.	Pakistan	10	1.02	14.
24.	Bangladesh	09	0.92	15.
25.	Bulgaria	09	0.92	15.
26.	Romania	09	0.92	15.
27.	South Africa	09	0.92	15.
	Total	973	100	

Table 5 shows the collaborations with scientist of 27 countries for 973 research papers. The maximum collaboration is found with the researchers of United States 405 (41.62%) followed by Canada 98 (10.07%), United Kingdom 65 (6.68%) and Switzerland 58 (5.96%), A negligible alliance is observed with the medicos of Bangladesh, Bulgaria, Romania and South Africa apiece 9 (0.92%).

❑ Preferred Journals

Table 6: Top 20 Journal Titles Preferred by Researchers

S. No.	Source Title	Number	%age	Rank
1.	Indian Journal of Paediatrics	897	5.22	1.
2.	Indian Journal of Medical Research	643	3.74	2.
3.	Indian Paediatrics	600	3.49	3.
4.	National Medical Journal of India	323	1.87	4.
5.	Indian Heart Journal	283	1.64	5.
6.	Neurology India	247	1.43	6.
7.	Indian Journal of Physiology and Pharmacology	225	1.30	7.
8.	Tropical Gastroenterology Official Journal of the Digestive Diseases Foundation	200	1.16	8.
9.	Journal of Association of Physicians of India	196	1.14	9.
10.	Indian Journal of Dermatology Venereology and Leprology	182	1.05	10.
11.	Indian Journal of Otolaryngology	160	0.93	11.
12.	International Journal of Cardiology	151	0.87	12.
13.	Indian Journal of Pathology and Microbiology	137	0.79	13.
14.	Journal of Anaesthesiology Clinical Pharmacology	136	0.79	14.
15.	Indian Journal of Experimental Biology	124	0.72	15.
16.	Lancet	121	0.70	16.
17.	International Urology and Nephrology	115	0.66	17.
18.	Journal of the Association of Physicians of India	100	0.58	18.
19.	Contraception	96	0.55	19.
20.	Indian Journal of Urology	96	0.55	19.
	Others	12149	70.71	
	Total	17,181	100	

AIIMS has published research works in around 145 journal titles and highest number is published in Indian Journal of Pediatrics 897 followed by Indian Journal of Medical Research 643, Indian Pediatrics 600 and National Medical Journal of India 323, while as journals like Contraception and Indian Journal of Urology rank 19th among preferred journals.

❑ Subject Wise Citation

It is revealed that among the subject facet of medical sciences Biochemistry Genetics & Molecular Biology is getting highest number of citations 16769, followed by Medicine 10663, Immunology and Microbiology 10034, Pharmacology and

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Toxicology 7054 & Neurosciences 6112 while as Arts and Humanities is getting least number of citations. During the decade 1996-2005 Biochemistry, Genetics & Molecular Biology obtained maximum number of citations 5005, followed by Medicine 4018, Immunology & Microbiology 3932 and Pharmacology & Toxicology 2214. In year 2006-2011 maximum numbers of citations are obtained by Biochemistry, Genetics & Molecular Biology 11764 followed by Medicine 6645, Immunology & Microbiology 6102, Pharmacology & Toxicology 4840, and Neuroscience 3722.

Table 7: Subject Wise Citation from 1996 -2011

S. No.	Subject Area	Papers	Citations From The Year 1996 - (June) 2011			Rank
			1996 - 2005	2006- 2011	Total	
1.	Biochemistry, Genetics & Molecular Biology	2686	5005	11764	16769	1
2.	Medicine	14381	4018	6645	10663	2
3.	Immunology& Microbiology	906	3932	6102	10034	3
4.	Pharmacology& Toxicology	983	2214	4840	7054	4
5.	Neuroscience	970	2390	3722	6112	5
6.	Agriculture & Biological Science	337	1375	2222	3597	6
7.	Health profession	311	839	1266	2105	7
8.	Psychology	97	499	999	1498	8
9.	Physics &Astronomy	176	545	748	1293	9
10.	Chemistry	145	308	952	1260	10
11.	Chemical Engineering	167	306	701	1007	11
12.	Environmental Science	97	375	388	763	12
13.	Nursing	122	125	633	758	13
14.	Dentistry	127	183	564	747	14
15.	Social Science	113	161	353	514	15
16.	Material Sciences	51	149	362	511	16
17.	Engineering	90	98	349	447	17
18.	Mathematics	59	321	122	443	18
19.	Multidisciplinary	85	184	222	406	19
20.	Veterinary	33	71	264	335	20
21.	Decision Science	39	259	75	334	21
22.	Computer Science	29	30	98	128	22
23.	Economics& Finance	07	54	59	113	23
24.	Earth & Planetary Science	10	54	39	93	24
25.	Business, Mgt & Accounting	07	19	17	36	25
26.	Energy	04	11	20	31	26
27.	Arts & Humanity	03	01	02	03	27
	Undefined	253	294	419	713	
	Total	22288	23820	43947	67767	

FINDINGS & CONCLUSION

The major findings are:

- The institution contributed 17181 publications, with maximum output from Medicine 14381(64.52%).
- Maximum number of document type are Articles 12820 (74.61%) while as least is Erratum 28(0.16) %.
- Decade 1999 - 2008 is leading with highest output 7537 (43.86%) published while as decade 1959 - 1968 had least output 83 (0.48%)
- "Biochemistry, Genetics & Molecular Bio." is the most cited subject area with 16769 citations.
- AIIMS has made 973 International and 2450 National collaborations.

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- There are 27 collaborating countries and 15 Indian states.
- United States (41.62%) as a country and New Delhi (70.61%) among Indian states is leading in collaboration.

It is obvious that need of the time is to promote and appreciate the research in health sciences. India, country of one billion people, need desperately sound well netted health care the one step in this direction could be genuinely and wide spread research in medical sciences. All India Institute of Medical Sciences is the premier institute of India where research is highly appreciated and has potential to have much higher research productivity in the field of medical science. However, proper planning and practical approach is needed, as it is evident from the study that there are some branches of medical science where research is going on at a great pace but several other fields are lagging behind. Institution should come up with sound strategies which can raise the research output in years to come, so that they can catch up with other leading countries of the world in health care. It is realized that improving strategies and methods of research, advancement in the field of science and technology, development in education, advanced training of research workers, Implementation of creative technologies, better economic conditions and moral society shall lead to further progress in medical science in India.

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User Study of Library Services of Panjab University Library, Chandigarh

Neelam Sharma

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Deputy Librarian
Panjab University
Chandigarh

Corresponding Author
Neelam Sharma
neelamkuki@yahoo.com

ABSTRACT

Nowadays, information is a basic necessity of everyday life. For anything and everything information is required. Information can be obtained or retrieved from a variety of sources. Libraries serve as a center for providing the right information to the right people at all times. Evaluation of the library and information services is one of the major concerns and an integral part of library and information science practitioners. User studies are to be recognized as an important part of the information packages. Information providers like the library and information centers need to be aware of their users' information requirements as well as their information seeking and information retrieving methods in order that they might be able to provide better services. This paper attempts to study the library services and its users in Panjab University Library, Chandigarh. This study examines several aspects of library use, including frequency of visiting the library,user satisfaction from library services and library collection . The study also covers the use of computer base services in the library. Some suggestions are also provided on the basis of study for enhancing the user satisfaction level.

KeyTerms: CD ROM, INDEST, Search Engines, Information Resources.

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INTRODUCTION

The university library serves as a nerve centre or a hub around which scholarship revolves and hence an indispensable instrument for intellectual development. A good university library is expected to have a rich variety of collection and service to which users may turn to for data or information. The developments in Information communication and technology have changed the user's expectations from the University Libraries in different ways. The way to build a collection and offer services to End Users now drastically vary from the recent past practices. To effectively meet the demands of the present day End Users, university libraries need to identify and adopt good practices and benchmarks. The impact of information technology revolution is huge on the new generation of users

PROFILE OF PANJAB UNIVERSITY LIBRARY

The Library is now fully computerized with an integrated system connected to the Campus Network providing Internet and e-mail facility to the University community. The reference collection of the Library is continuously updated, and augmented with the acquisition of CD-ROM databases and access to on-line databases on Internet. On-line Public Access Catalogue facility is available at the Reference Desk on the First Floor of the Library. OPAC can also be accessed through any terminal on the Campus Network. Library collection can also be searched through Web OPAC.

The Panjab University Library (PUL) has a rich collection of 7, 20,776 publications which include books, bound volumes of journals, theses/dissertations, rare books, reports, government documents, back files of newspapers and a prized collection of 1490 manuscripts. The Library subscribes to about 600 current periodicals. Its holdings of back volumes of periodicals go back to nineteenth century. Library subscribes to MathSciNet online comprising of current Mathematical publications & Mathematical Reviews, and has access to 225 online full text journals as part of print journals subscription. Also access to approximately +5500 online full text journals is available through INDEST- Consortium and UGC- INFONET.

LITERATURE REVIEW

For providing excellent services, it is necessary for the library to know its users closely and to serve them in the way they desired. Many researchers and practitioners have explored user studies that provide reference for libraries to apply user-oriented service. So review of the core research related to user studies will give libraries an easy way to apply user-oriented service. This review

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comes in the purview of evaluation of the use of library and information services. Obioma (1986), sees evaluation as the quantitative judgment resulting from assessment arising from testing and measurement. Such evaluations are based on users utilizing these services. A user study may be defined as a systematic study of information requirements of users in order to facilitate meaningful exchange between information systems and users, Roy (2003). Information seeking behavior under digital and environmental catches more sight.

Bruce (2005) states that, "information plays a significant role in our daily professional and personal lives and we are constantly challenged to take charge of the information that we need for work, fun and everyday decisions and tasks." In the digital era, research on information-seeking behavior has taken on even more importance worldwide. Julien (2000) observes that regular library users are active learners who participate more in class, and read, write and study more. Jubb et.al. (2007), observe that academic libraries have for centuries played critically important roles in supporting research in all subjects and disciplines within their host universities or colleges. In a study done on university library in West Bengal, Saha (2011) has highlighted that most of the users of University Library are not so aware about the collections of his/her library.

OBJECTIVES

The study was conducted with the following major objectives:

- To explore the information seeking behavior of the user of PUL.
- To determine user level of satisfaction with PUL facilities and services.
- To know the viewpoints of library users about the services provided.
- To identify the information awareness including E-environment of students and their interest.
- To identify the user needs regarding collection development and on the basis of their inputs to give suggestions for improving the services.

RESEARCH METHODOLOGY

The survey method was adopted for the study. The study used a questionnaire to collect data, which is consisted of 24 questions. The first seven questions dealt with demographic and educational characteristics. The data were collected on a sample of 50 users of Panjab University, Chandigarh. Questionnaires were personally distributed to the users and were returned with 100% response.

RESULTS

❑ Gender Wise Respondents

Table 1: Gender Wise Respondents

Gender	Respondents	%age
Male	19	38
Female	31	62
Total	50	100

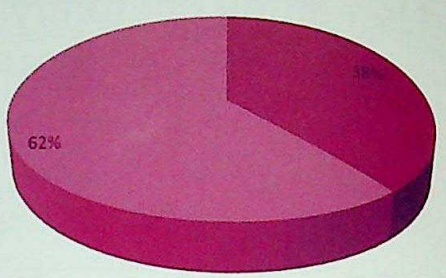

Figure 1: Gender Wise Respondents of PUL

The gender wise distribution of PUL users is shown in table and figure 1. It may be seen from the table that majority 31(62%) respondents are female and the remaining 19(38%) are male respondents.

❑ Age Wise Distribution of PUL

Table 2: Age Wise Distribution

Age	Respondents	%age
21-30	48	96
31-40	02	4
	50	100

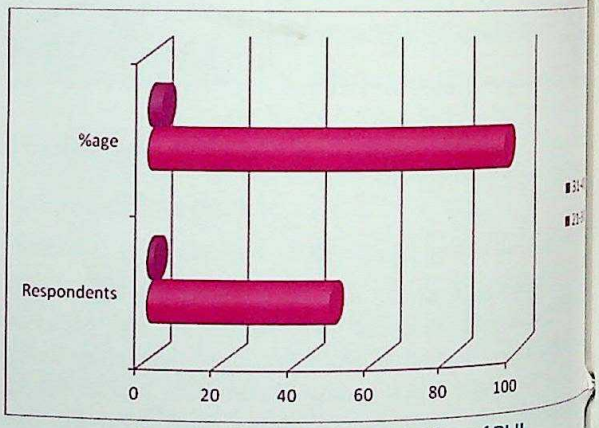

Figure 2: Age Wise Distribution of PUL

The age wise distribution of PUL respondents is shown in table and figure 2. Most of them 96% are in the age range of 21-30. Only 2(4%) of them are in the age range of 31-40 years.

❑ Stream Wise Distribution of PUL

Table 3: Stream Wise Distribution

Stream	Respondents	%age
Arts	40	80
Science	10	20
	50	100

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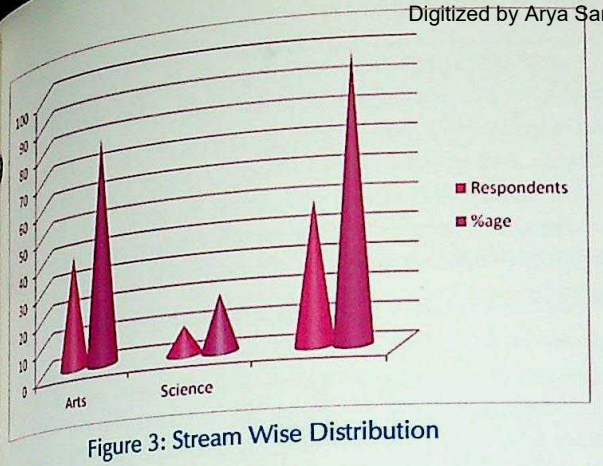

Figure 3: Stream Wise Distribution

Table and figure 3 shows that out of 50 respondents 40(80%) respondents are from arts stream and10 (20%) are from science stream.

❑ Category of Library Users

Table 4: Category of Library Users

Category	Users	%age
Research Scholar	34	68
Teacher	3	6
Post Graduate	12	24
Graduate	1	2
Total	50	100

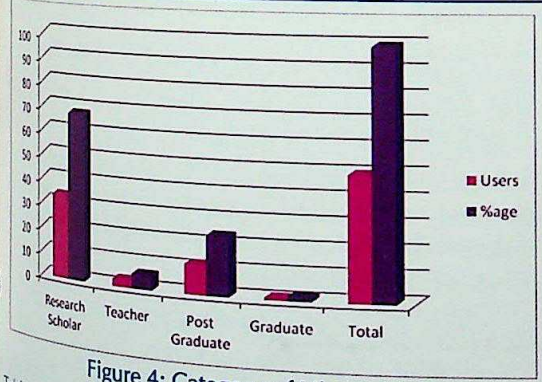

Figure 4: Category of Library Users

Table & figure 4 reveals that highest 34(68%) are research scholars, 12 (24%) postgraduate students, 3 (6%) faculty members, and only one Graduate 2% student.

❑ Frequency of Library Visiting

Table 5: Frequency of Visiting

Frequency	Users	%age
Daily	32	64
Weekly	16	32
Fortnightly	1	2
Monthly	1	2
Total	50	100

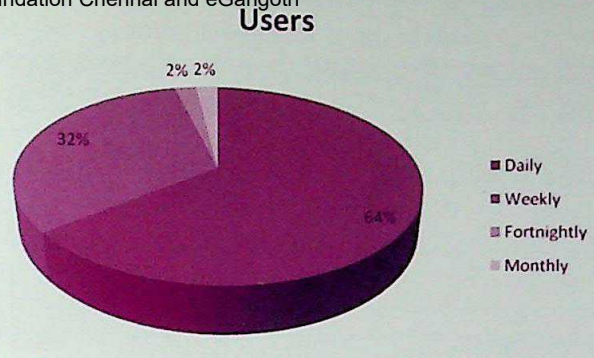

Figure 5: Frequency of Visiting

Table 5 indicates that the majority 32(64%) of users visited the library every day. The 16 respondents (32%) visited the library once a week. One respondent (2%) visited the library fortnightly and monthly.

❑ Preference of Mode of Information Accessibility

Table 6: Mode of Information Accessibility

Mode	Users	%age
Manual	1	2
Online	7	14
Both	42	84
Total	50	100

Table 6 revealed that 84% of the respondents preferred the both manual and online search access approaches for seeking information and 14% preferred online search and only 2% used manual mode of information accessibility.

❑ Use of Computer Based Services

Table 7: Use of Computer Based Services

Services	Yes (%age)	No (%age)	Neutral (%age)
E-Mail service	14 (28%)	34(68%)	2(4%)
Internet service	41(82%)	7 (68%)	2(4)
Database Service	50(100%)	0	0
On Line Database	41 (82%)	9(18%)	0
CD ROM Data base	5(10%)	45(90%)	0
E -journal users	39(78%)	10(20%)	1(2%)

Table 7 gives data on the use of computer based services. Out of 50 respondents, 14 (28%) used E-mail service, 41(82%) browsed internet, 50 (100%) searched database service, 41(82%) looked for online data bases, 5(10%) were interested in CD ROM databases and 39(78%) accessed e-journals.

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- Use of Web Search Engines

Table 8: Use of Web Search Engines

Search Engine	Yes (%)	No (%)
Yahoo	22(44%)	28(56%)
Rediff	4(8%)	46(92%)
Google	46(92%)	4(8%)
AltaVista	5(10%)	45(90%)
India Times	2(4%)	48(96%)

In table 8, 46(92%) users used the Google, 22(44%) used the Yahoo and only 2(4%) users used the India Time search Engine, 4(8%) used Rediff search Engine and 5(10%) used the Alta Vista search engine.

- User Preference for Mode of Information Resource

Table 9: Mode of Information Resource

Mode	Yes (%)	No (%)
Books	43(86%)	7(14%)
Reference Books	32(64%)	18(36%)
Periodicals	26(52%)	24(48%)
CD ROM	13(26%)	37(74%)
Internet	34(68%)	16(32%)
On line Information Resource	36(72%)	14(28%)
E- Journals	38(76%)	12(24%)

Table 9 reveals the preference for mode of information resource. It is observed that the majority of users 43 (86%) used books as an information resource. 38 users (76%) used E- Journals. The number of users using CD-ROM was only 13 (26%).

- Consulting the Library Staff for Services

Table 10: Consulting the Library Staff Services

Consulting the Library Staff	Yes (%)	No (%)
To find book	40 (80%)	10(20%)
To find Periodicals	25(50%)	25(50%)
To find Bound volumes of Periodical	10(20%)	40(80%)
To find facts and figures	6(12%)	44(88%)
To search information on net	23(46%)	27(54%)

Table 10 shows that 40(80%) users took the help to locate the books, 25(50%) took the help to locate the periodicals, 10(20%) to find the bound volumes, 6(12%) looked into facts and figures and 23(46%) took the help of the library personnel to search the information on the net since they were not well versed with net surfing.

CONCLUSION

Only 6% faculty members are using the library compared to other users. It is expected, because the number of faculty members visiting library at any given time during the day in the university library and making use of library services provided would be fewer than the other categories of users due to internet connections provided to the faculty members in their rooms in respective departments.

It has been noted that the majority of the users 80% in this study preferred both manual and online search access approaches in seeking the information. Of the computer based services available in the library, the survey indicates that the majority of respondents used internet and data based service. The number of users searching on line databases was fewer. Google is very popular search engine among users as 92% respondents were using it. The maximum number of respondents 86% used books as an information resource; only 13% users are using CD-ROM. The majority of the users 80% sought the help of the library professional staff to locate the books. E-books and journals are commonly perceived as offering great potential for learning support but also as struggling to compete with print due to limited range of titles offered.

SUGGESTIONS

Since most of the new library members are not familiar with the library collections and services, there should be an orientation programme for them and also for using online databases. The facilities available in the university library should be fully notified to the students and other users.

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Citation Analysis of Ph.D Theses of LIS in Dr. Harisingh Gour University, Sagar

Jyoti Gupta* and V.P. Khare**

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*Assistant Librarian
Mody Institute of Technology & Science
(Deemed University)
Lakshmangarh Sikar, Rajasthan
**Professor (DLIS)
Bundelkhand University, Jhansi

Corresponding Author
Jyoti Gupta
jyoti.2829@yahoo.com

ABSTRACT

This paper addresses to research performance monitoring the researchers of Dr. Harisingh Gour University, Sagar using citation analysis. The study covers 7284 citations and evaluates different aspects of citation study. The most of the cited sources were journals, and cited books preferred to single authorship 77.73% followed by two authors 18.67%. Study reveals that most of the contributions of journals were from USA, and the most cited journals are IASLIC Bulletin 11.89%, followed by ILA Bulletin 9.35% occupies the second rank, University News 6.37% and Herald of Library Science 5.99% at 3rd and 4th rank respectively.

KeyTerms: Citation Ranking, Citation Analysis, Bibliometrics, Bibliography, Journal Ranking, Scientometric.

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INTRODUCTION

Citation analysis has become one of the popular methods employed in the identification of core journal in a particular subject field or for a particular scientific community in a geographical area. Citation analysis is also a technique that gives potentially valuable information in the management of library journal collection. It helps to identify the quality of the information sources. Citation analysis now considered as an active area of bibliometric research. Rising subscription rates, limited allocation of budget and the space problem for current holding has resulted in a number of users' studies. Limited financial resources have force the librarian to determine collection development policies which will make maxi mum use of money and space available for meeting the varied needs of the users. A set of data items used to uniquely identify a document, namely, author, publisher, title, edition, place of publication. It may also include other elements such as pagination, footage and format, Ghai (2001).

The purpose for evaluating research performance is to identify areas for improvement in the quality of research. Basically, all research performance evaluation systems revolve around the concept of quality. Among the various methods that have been proposed and used to complement the traditional research performance evaluation measures, citation analysis was and still is one of the most widely used, Chubin (1990), Martin (2006) and Thomas (1998). Citation analysis exemplified in this study by citation ranking or citation counts claims to provide researchers with an effective indicator for assessing not only the research performance of individual authors, but also for assessing the relative quality of books, papers, journals, programs, etc, Meho (2000).

REVIEW OF LITERATURE

Review of related literature of Library & Information Science reveals the existence of a large number of bibliometric and quantitative studies. Anil Kumar et.al. (2011), investigated in "Citation analysis of doctoral dissertations at IIMA: A review of the local use of journals. Chen, J.et.al. (2011), in "Analysis of highly cited papers published in Chinese Journal of Endemiology during 2000-2006. Dingyu (2011), made a Quantitative study under the title "Quantitative analysis of research papers on library personalized service in China in 2000-2010. Mahbuba, et.al. (2010), analyzed citations in "A scientometric analysis of health and population research in South Asia: Focus on two research organizations. Olatokun et.al. (2009), studied master's theses in animal science and found that journals were the most used reference materials, and that poultry nutrition and agricultural biochemistry and nutrition were the most frequent topics. Vallmitjana et.al. (2008), applied the method in "Citation Analysis of Ph.D. Dissertation References as a tool for Collection Management in an Academic Chemistry Library.

OBJECTIVES

The research aims at establishing the followings objectives:

- To study the rate of collaborative authorship (Books) by analysing the citations pattern.
- To determine the use pattern of different types of documents like books, periodicals, journal articles etc.

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- Observe the age wise distribution of citation to determine the productive year of used publications.
- To study the distribution by place of publication to find out the country of origin of the published documents.
- Compile a rank list of core journals in Library & Information Science.

METHODOLOGY

The study focused at deriving quantitative and qualitative analysis based on the citations collected from the end of the chapters of doctoral theses in Library and Information Science in Dr. Harisingh Gour University, Sagar, All references in footnotes, endnotes and bibliographies of the entire 7284 citations of 28 theses submitted till 2010.

DATA ANALYSIS

The analysis of the data has been done on the following aspects to meet the stated objectives.

❑ Bibliographic Form Dispersion

Table 1: Bibliographic Form Dispersion

Bibliographic Form	No. of Citations	Cumu. No. of Citations	%age	Cumu. %age
Journal Articles	2953	2953	40.54	40.54
Books/Guides	2191	5144	30.08	70.62
Reports	513	5657	7.04	77.66
Conference Proceedings	457	6114	6.27	83.94
Reference Sources	411	6525	5.64	89.58
Theses	221	6746	3.03	92.61
Case Study/Survey	208	6954	2.86	95.47
Govt. Publications	158	7112	2.17	97.64
Web sites	158	7270	2.17	99.81
Letters/Lectures	14	7284	0.19	100
Total	7284	7284	100	100

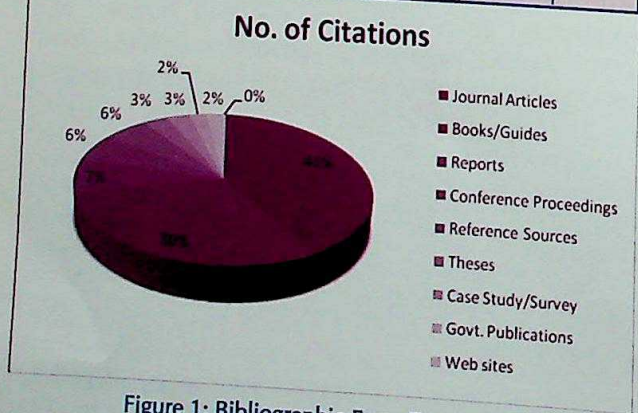

Figure 1: Bibliographic Form Dispersion

Table and figure 1 shows that distribution of the cited document based on 10 identified bibliographic forms like books, Journal articles, conference proceedings, reports, web sites, govt. publications, reference sources, theses and dissertations, conference proceedings, reports, government publications, c... studies and letters/lectures.

It is found that journals and books are widely used format by ... researcher of University. More than 70% of literature is in the f... of journals and books. Journal articles 2953(40.54%) followed ... books 2191(30.08%), reports 513(7.04%), confere... proceedings 457(6.27 %), reference sources 411(5.64 %), thes... 221(3.03 %), case study/survey 208(2.86%), govt. publicati... 158(2.17 %), web sites 158(2.17 %), letters/lectures14 (0.19 %...

❑ Authorship Distribution

Table 2: Authorship Distribution

Author	No. of Citations	Cumulative of Citations	%age	Cumulative %age
Single Author	1703	1703	77.73	77.73
Two Authors	409	2112	18.67	96.39
Three Authors	25	2137	1.14	97.54
More than Three Authors	54	2191	2.46	100
Total	2191	2191	100	100

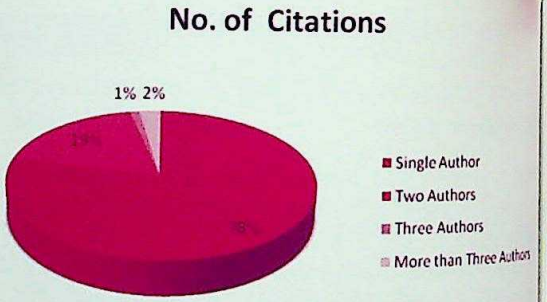

Figure 2: Authorship Distribution

Table and figure 2 show authorship dispersion i.e. single author ... covers 1703 (77.73%), followed by two authors 409 (18.67% ... three authors 25(1.14%) and more than three authors 54(2.46% ... in the total citations. Single author covers more than 75% o... citations in out of total citations.

❑ Degree of Collaboration

Table 3: Single Vs Multi Authored Works

Author	No. of Citations	% age
Single Author	1703	77.73
Multiple	488	22.27
Total	2191	100

$$C = \frac{488}{488 + 1703} = 0.22$$

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Figure 3: Single Vs Multi Authored Works

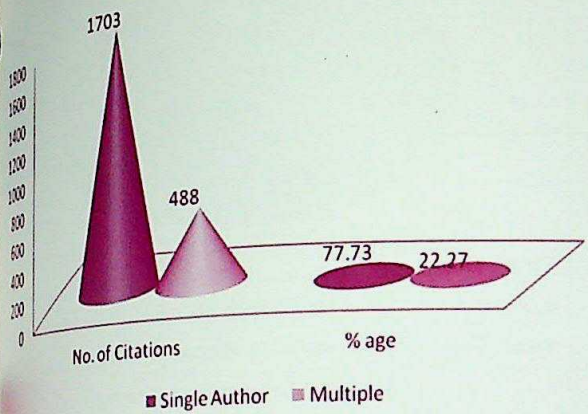

Table and figure 3 shows that rate of collaboration in LIS is 0.22, which reflects the degree of prevalence of single authored publication in Library and Information Science.

❑ Period Wise Dispersion of Books

Table 4: Period Wise Dispersion of Books

S.No.	Year of Books	No. of Citations	Cumulation No. of Citations	% of Citations	Cumulation % of Citations
1	2006-2010	32	32	1.46	1.46
2	1996-2005	461	493	21.04	22.50
3	1986-1995	749	1242	34.19	56.69
4	1976-1985	506	1748	23.09	79.78
5	1966-1975	265	2013	12.09	91.88
6	1956-1965	122	2135	5.57	97.44
7	1946-1955	29	2164	1.32	98.77
8	1936-1945	16	2180	0.73	99.50
9	1926-1935	11	2191	0.50	100
	Total	2191	2191	100	100

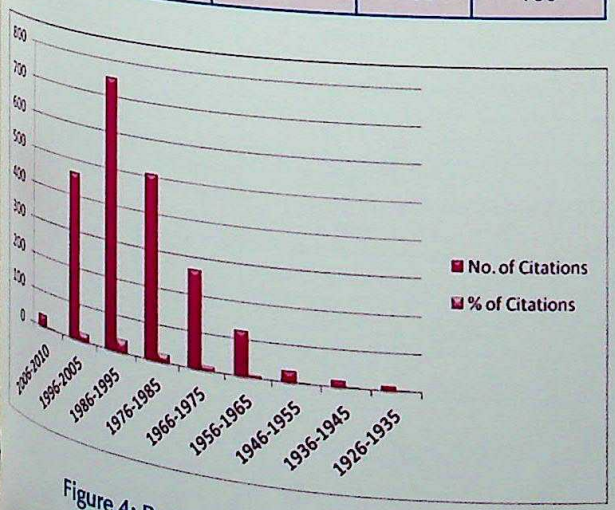

Figure 4: Period Wise Dispersion of Books

Table and figure 4 gives the result of cited documents (Books). In which time spans of 1986-1995 is the most productive year's covering 749(34.19%) citations followed by 1976-1985 which covers 506(23.09 %) citations, 1996-2005 covers 461(21.04 %) citations and 1966-1975 covers 265(12.09%) citations. Comparatibily the 1956-1965 which covers 122(5.57%) citations followed by 2006-...covers 32(1.46%) ,1946-1955 covers 29(1.32%)citations, 1936-1945 covers 16(0.73%) citations, 1926-1935 covers 11(0.50%) citations are less productive spans.

❑ Period Wise Dispersion of Journals

Table 5 : Period Wise Dispersion of Journal

S. No.	Years of Journal	No. of Citations	Cumu. No. of Citations	%age of Citations	Cumu. age % of Citations
1	2006-2010	33	33	1.12	1.12
2	1996-2005	737	770	24.96	26.08
3	1986-1995	996	1766	33.73	59.80
4	1976-1985	618	2384	20.93	80.73
5	1966-1975	354	2738	11.99	92.72
6	1956-1965	171	2909	5.79	98.51
7	1946-1955	34	2943	1.15	99.66
8	1936-1945	2	2945	0.07	99.73
9	1926-1935	8	2953	0.27	100.00
	Total	2953	2953	100	100

Figure 5: Period Wise Dispersion of Journal

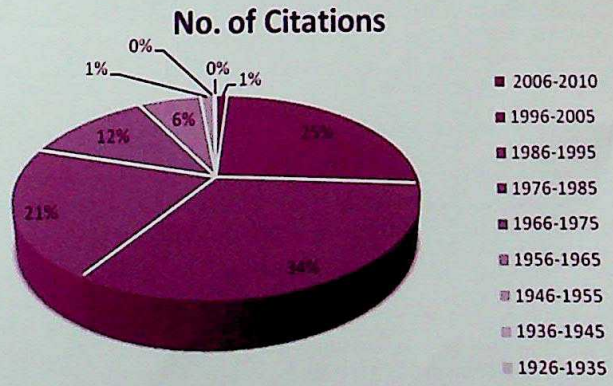

Table and figure 5 gives the result of cited journals in Dr. Harisingh Gour University, Sagar. All the 2953 citations by 28 scholars in their research output are arranged in a decreasing chronological order. In which 1986-1995 is the most productive span of time covers 996(33.73%) citations followed by 1976-1985 covers 618(20.93%) citations, 1996-2005 covered 737(24.96 %) citations and 1966-1975 covered 354(11.99 %) citations. Comparatibily to 1956-1965 covered 171 (5.79%)citations followed by 1946-1955 covered 34 (1.15%) citations, 2006-... covered 33 (1.12%), 1926-1935 covered 8(0.27%) citations ,1936-1945 covered 2(0.07%) citations, are less productive spans.

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❑ Country wise Dispersion of Journal

Table 6: Country wise Dispersion of Journal

Place of Journal	No. of Citations	Cumulative No. of Citations	% age of Citations	Cumulative %age of Citations
USA	114	114	44.71	44.71
India	59	173	23.14	67.84
UK	41	214	16.08	83.92
Netherland	13	227	5.10	89.02
Australia	8	235	3.14	92.16
Canada	5	240	1.96	94.12
Nigeria	4	244	1.57	95.69
South Africa	3	247	1.18	96.86
West Germany	2	249	0.78	97.65
Taiwan	1	250	0.39	98.04
Africa	1	251	0.39	98.43
France	1	252	0.39	98.82
Japan	1	253	0.39	99.22
Pakistan	1	254	0.39	99.61
South Australia	1	255	0.39	100
Total	255	255	100	100

Figure 6: Country wise Dispersion of Journal

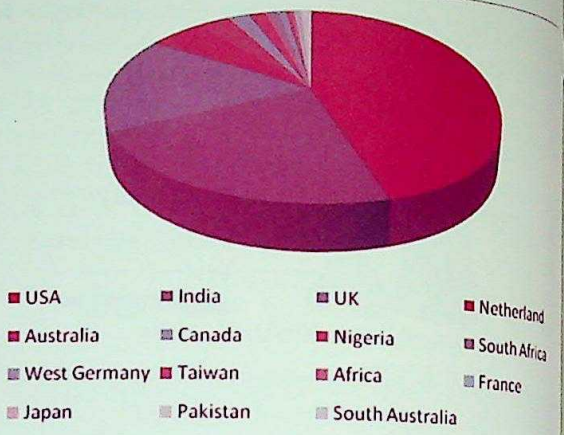

Table and figure 6 shows that in term of total number and % of citations by countries, USA contributes the largest numbe citations used by researchers of Dr. Harisingh Gour Univers Sagar with 114(44.71%)citations, followed by India w 59(23.14%) citations, UK with 41(16.08%) citatio Netherlands with 13(5.10 %) citations, Australia with 8(3.14 citations, Canada with 5(1.96%) citations, Nigeria with 4(1.57 citations, South Africa with 3(1.18 %) citations, West Germa with 2(0.78%) citations. It has to be noted here that Taiwa Africa, France, Japan, Pakistan, South Australia produce sa number of citation i.e. only 1(0.39 %) citations.

❑ Ranking of Journals

Table 7: Ranking of Journals

S. No.	Title of Journals	Rank	No. of Citations	Cumu. No. of Citations	% of Citations	Cumu.% of Citations
1	IASLIC Bulletin (India)	1	351	351	11.89	11.89
2	ILA Bulletin (India)	2	276	627	9.35	21.23
3	University News (India)	3	188	815	6.37	27.60
4	Herald of Library Science(India)	4	177	992	5.99	33.59
5	Library Herald(India)	5	162	1154	5.49	39.08
6	Annals of Library Science Studies (India)	6	111	1265	3.76	42.84
7	Annals of Library science Documentation (India)	7	91	1356	3.08	45.92
8	Journal of Documentation (U.K.)	8	85	1441	2.88	48.80
9	DESIDOC Bulletin of Information Technology (India)	9	83	1524	2.81	51.61
10	Library Science with slant to Documentation (India)	10	78	1602	2.64	54.25
11	Journal of Library and Information Science (India)	11	68	1670	2.30	56.55
12	Indian Librarian (India)	12	64	1734	2.17	58.72
13	Lucknow Librarian (India)	13	61	1795	2.07	60.79
14	College and Research Libraries(U.S.A.)	14	57	1852	1.93	62.72
15	ASLIB Proceeding (U.K.)	15	41	1893	1.39	64.10
16	Library Trends (U.S.A.)	16	40	1933	1.35	65.46
17	Indian Journal of Information Library and Society (India)	17	37	1970	1.25	66.71

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18	IAALD Quarterly Bulletin (U.K.)	18	36	2006	1.22	67.93
19	Bulletin of Medical Library Association(India)	19	33	2039	1.12	69.05
20	Library Journal (U.S.A.)	20	31	2070	1.05	70.10
21	Special Library (U.S.A.)	20	31	2101	1.05	71.15
22	Library Collection, Acquisition & Technical Services (U.S.A.)	21	25	2126	0.85	71.99
23	Library Acquisition : Practice & Theory (U.S.A.)	22	24	2150	0.81	72.81
24	NISSAT, Newsletter (India)	22	24	2174	0.81	73.62
25	Electronic Library (U.S.A.)	23	20	2194	0.68	74.30
26	Library Progress(International) (India)	23	20	2214	0.68	74.97
27	Management Information System Quarterly (U.S.A.)	24	19	2233	0.64	75.62
28	Blind Welfare (South Australia)	25	18	2251	0.61	76.23
29	Law Library Journal (U.S.A.)	26	17	2268	0.58	76.80
30	LIBRI (West Germany)	26	17	2285	0.58	77.38
31	Journal of American Society for Information Science (U.S.A.)	27	16	2301	0.54	77.92
32	Library Hi-Tech News (U.K.)	27	16	2317	0.54	78.46
33	Program (U.K.)	27	16	2333	0.54	79.00
34	International Library Review (U.K.)	28	14	2347	0.47	79.48
35	CLIS Newsletter (India)	29	13	2360	0.44	79.92
36	Journal of Library Administration(U.S.A.)	29	13	2373	0.44	80.36
37	Library Quarterly (U.S.A.)	29	13	2386	0.44	80.80
38	Library Technology Report (U.S.A.)	30	12	2398	0.41	81.21
39	CALIBER (India)	31	11	2409	0.37	81.58
40	Information Technology and Libraries (U.K.)	31	11	2420	0.37	81.95
41	Journal of Education Librarianship(U.S.A.)	31	11	2431	0.37	82.32
42	Journal of Library Automation(U.S.A.)	31	11	2442	0.37	82.70
43	Action Aid Disability News (India)	32	9	2451	0.30	83.00
44	ARIST (U.S.A.)	32	9	2460	0.30	83.31
45	ERIC (U.S.A.)	32	9	2469	0.30	83.61
46	Library Philosophy and Practice (U.S.A.)	32	9	2478	0.30	83.91
47	Library Review (U.K.)	32	9	2487	0.30	84.22
48	Library and Information Science Research Electronic Journal (Australia)	33	8	2495	0.27	84.49
49	Collection Management(U.S.A.)	34	7	2502	0.24	84.73
50	Electronic Journal of Academic and Special Librarianship (Canada)	34	7	2509	0.24	84.96
51	Indian Management (India)	34	7	2516	0.24	85.20
52	Journal of Library Science(Taiwan)	34	7	2523	0.24	85.44
53	LIBRA (India)	34	7	2530	0.24	85.68
54	Library and Information Science Research (Netherlands)	34	7	2537	0.24	85.91
55	Library Hi-Tech (U.S.A.)	34	7	2544	0.24	86.15
56	Library Resources &Technical Services(U.S.A.)	34	7	2551	0.24	86.39

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57	SRELS- Journal of Information Management (India)	34	7	2558	0.24	86.62
58	BMA Newsletter(UK)	35	6	2564	0.20	86.83
59	Drexel Library Quarterly (U.S.A.)	35	6	2570	0.20	87.03
60	International Classification (U.S.A.)	35	6	2576	0.20	87.23
61	International Library Movement (Australia)	35	6	2582	0.20	87.44
62	Open System Review (U.S.A.)	35	6	2588	0.20	87.64
63	Resource Sharing and Information Networks (U.S.A.)	35	6	2594	0.20	87.84
64	Social Science Institution Studies (Pakistan)	35	6	2600	0.20	88.05
65	UNESCO Bulletin for Libraries (France)	35	6	2606	0.20	88.25
66	University Handbook (India)	35	6	2612	0.20	88.45
67	Australian Library Journal (Australia)	36	5	2617	0.17	88.62
68	Computer in Libraries (U.S.A.)	36	5	2622	0.17	88.79
69	Educational and Psychotically Measurement (U.S.A.)	36	5	2627	0.17	88.96
70	International Journal of Information Resource Management (U.S.A.)	36	5	2632	0.17	89.13
71	Journal of Academic Librarianship (Netherlands)	36	5	2637	0.17	89.30
72	The Serials Librarian (U.S.A.)	36	5	2642	0.17	89.47
73	Wilson Library Bulletin (U.S.A.)	36	5	2647	0.17	89.64
74	American Librarian (U.S.A.)	37	4	2651	0.14	89.77
75	Ariodne (U.K.)	37	4	2655	0.14	89.91
76	IFLA Bulletin (Netherlands)	37	4	2659	0.14	90.04
77	Information Today (U.S.A.)	37	4	2663	0.14	90.18
78	International Journal of Medical Informatics (Netherlands)	37	4	2667	0.14	90.31
79	LRTS (U.S.A.)	37	4	2671	0.14	90.45
80	Online (U.S.A.)	37	4	2675	0.14	90.59
81	Public Library Quarterly (India)	37	4	2679	0.14	90.72
82	Vikalpa (India)	37	4	2683	0.14	90.86
83-107	25 Journals have Three Citations (3x25=75)	38	75	2758	0.10	93.40
108-154	47 Journals have Two Citations(2x47=94)	39	94	2852	3.18	96.58
155-255	101 Journals have one Citation(1x101=101)	40	101	2953	3.42	100
			2953	2953	100	100

Table 7 shows that total 255 journals with 2953 citations arranged in the order of decreasing number of their rank. Coming to the Indian situation as for as periodicals literature is concerned, it can be ascertained that IASLIC Bulletin 11.89%, Library Science journal occupies the first rank as the most preferred journal having been cited 351 times. ILA Bulletin 9.35% occupies the second rank getting 276citations, followed by University News 6.37% with 188 citations, Herald of Library Science 5.99% with 177 citations, Library Herald 5.49% with 162 citations, Annals of Library Science Studies 3.76% with 111 citations, Annals of Library Science and Documentation 3.08% with 91 citations, Journal of Documentation 2.88% with85 citations, DESIDOC Bulletin of Information Technology 2.81% with 83 citations, Library Science with a slant to Documentation 2.64% with citations respectively. The first ten journals in the ranking together account for 54.25% of the total citations. However, table shows that first 50 Journals accounted for nearly 84.96% citations. Thus, it is found that only a few journals yielded m citations and more journals yielded only a few citations.

CONCLUSION

The study covers 28 doctoral theses submitted to the departm of LIS in Dr. Harisingh Gour University, Sagar. The most of cited sources were journals, and cited books preferred to sing authorship 77.73%. The analysis reveals that maximum boo and Journal used in Library & Information science be

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published during the 1986-95. Maximum literature consulted in both universities belongs to USA in first position in journals publications. It can be ascertained that in Dr. Harisingh Gour University, Sagar IASLIC Bulletin with 351(11.89%), is a journal which is ranked as the most preferred journal.

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The Usage Pattern of ScienceDirect Database in University of Hyderabad: An Analytical Study

Y. Nagireddy* and V.J. Suseela**

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*I/C University Library

**Asst. Librarian
IGM Library
University of Hyderabad
Hyderabad

Corresponding Author
V.J. Suseela
vjsuseela@gmail.com

ABSTRACT

The present day library user community is coming across an ever dynamic and complex learning environment in the university libraries, due to ICT applications. The exponential growth of documents in digital formats, subscriptions to electronic databases in addition to print, are changing the expectations of users, their needs, preferences, approaches and constraints, etc. Since, the information concerning their use will help the libraries to develop good collection and to improve the services, the libraries are adapting several methods such as surveys, interactions, and the latest usage data for evaluating electronic databases, to get such information. Thus an analytical study was undertaken by taking usage reports of Sciencedirect database in IGM Library, University of Hyderabad to find out the benefits in terms of core and peripheral journals; to observe its usage pattern; and to find out the relationship between the number of available journals and their usage. Finally the study examines the university user's perspectives on ScienceDirect database. The results indicate that the database was extensively used in terms of downloads and access methods.

KeyTerms: ScienceDirect, User Perspectives, Usage Metrics, Usage of Online Databases.

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INTRODUCTION

Library users are the most essential component of information communication chain wherein they use the latest information sources, research results for their academic pursuits. The present day user community are coming across an ever dynamic and complex environment in the university libraries, due to the application of ICT , electronic publishing, Internet, World Wide Web etc., exponential growth of digital documents in multiple formats, library's subscriptions to electronic collections in addition to print formats, the changed expectations of users, their needs, preferences, approaches and constraints.

Since the web technology became an indispensable tool in disseminating scholarly information, the networked electronic resources were continuously added by almost all the publishers or aggregators. At present the subscription to e-journals, books etc became essential to academic libraries. The information concerning their use will help to develop good library collection and to improve the services. In this regard user surveys, interactions and usage data are considered highly significant by the libraries for devising a system or a tool to develop user centric collection as well as services. Like in any other domain, the technological advancements adapted by Information industry brought several changes in getting objective usage data for facilitating meaningful presentations. The conventional surveys conducted by the LIS researchers, institutions and publishing companies are currently taking the form of web-based surveys links posted over professional forums, list servers, social network sites and email/chatting rooms etc. In addition to these surveys the usage metrics that are formatted by publishers/vendors are now extensively used to find out the user perspectives on a particular product and services.

APPLICATION OF USAGE METRICS FOR EVALUATION

The application of web technologies by information and publishing industry for distributing the scholarly content to organizational users lead to the generation of usage reports (metrics) by the database vendors or aggregators.

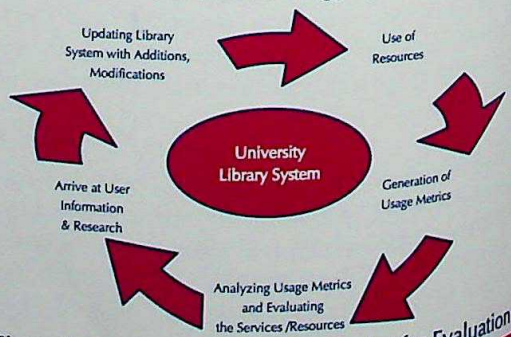

Figure 1: Application of Usage Metrics for Evaluation

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Similar to the changes in publishing industry the research trends in LIS (Library and Information Science) are also changing. The format, the content and the distribution of usage metrics are dependant on the type of database, purpose, the method of accessing and the standards followed by the publishers or vendors. Several kinds of inferences can be drawn from this web-based metrics in the form of full text downloads, bibliographic searches, access to statistical data , browsing, users preferences etc.

REVIEW OF LITERATURE

Now a day's libraries are spending major part of their budget on electronic resources. Several studies were undertaken in developed countries like US and UK to evaluate the electronic resources subscribed by various libraries. In a survey of twenty-four libraries conducted by, Shim et.al. (2002)under Association of Research Libraries E-Metrics project, by collecting the usage data for electronic materials and services, they found that a number of libraries were not well prepared to take the usage data related to networked resources and services due to lack of consistency in comparable statistics from the vendors. Cohen (2003), was of the opinion that the web server log files can provide measures to serve the needs of both library administrators and website managers, but the data can't evaluate the user experiences. He suggested that libraries should supplement log file data with user surveys, focus groups, usability studies, interviews and feedback. Jacoby et.al. (2004), identified problems and issues related to the assessment of electronic resources and usage measures based on "page hits" collected from the fall 2002 to spring 2003 semesters for after-hours and off-campus usage. The results indicate that electronic resources were extensively used during non-traditional service hours from outside the library's physical walls. Franklin et.al. (2006), mentioned that most of the web surveys were not open to inferential statistical statements about the populations and therefore the non-response rate for most web surveys was high, and biased. They were of the opinion that web surveys have been used to collect data about users in the past or about sessions, but not about the actual usage. Pagano (2009), used various web metric tools like user's background, their needs, accomplishments, time, response, satisfaction, recommendations of site etc. Further he has identified six primary parameters of web metrics viz - site traffic (internal); surveys and direct customer interaction (internal); quality assurance (internal); internet traffic (external); social web (external); awareness and marketing (external). Nicholas et.al. (2009), compared the actual information seeking behavior of students (undergraduates and postgraduates) in a digital scholarly environment by analyzing the log data generated by the Virtual Scholar research program for a period of four years from Blackwell Synergy and OhioLINK, and one e-book collection (Oxford Scholarship Online). The study indicated that a distinctive pattern of information-seeking behavior was identified among the students and other members of the academic community, e.g. students constituted the major users group in terms of longer sessions and pages viewed. Undergraduates and postgraduates were mostly using library links to access scholarly databases. Malliari (2010), tested the searching behavior of the patrons after updating the software during the spring semester of the academic year 2007-2008, from the transaction logs data with 39 variables and 6948 sessions. After analyzing the data by multivariate techniques, he found that the patrons search attitude was doubled during the period of study compared to that of the previous one. Nicholas et.al. (2010), in UK has investigated the digital behavior of research's in terms of usage, content referred, navigational preferences, routes used to access e-journal content and titles used; and also to ascertain whether their behavior vary by subjects or disciplines, or the institutions in which they work. For this purpose, raw logs of ScienceDirect were obtained for the period January to April 2007 in 5 subject categories i.e. Business & economics; Chemistry; Earth sciences; Life sciences; and Physics from 2 research organizations and 8 universities. The data revealed that 98% of 1,400 ScienceDirect journals were used and 80% of the usage was from 20 per cent of the titles. Researchers used one fourth of e-journals and around 15% of ScienceDirect use was noticed in the nights and over the weekends. Nagi Reddy et.al. (2006), examined the usage pattern, level of satisfaction of EBSCO Host the aggregator's online full text journal database, in IGM Library, university of Hyderabad for the period 2001-04 by analyzing the usage statistics. They found that subscription to EBSCO Host increased the journal collection from 2066 to 12300 during the period and the library could save Rs.7 to 12.5 lakhs by canceling the duplicate print journals. The article full text downloads increased from 2979 to 3042; abstracts increased from 458 to 11049, searches increased 467 to 2808 and sessions 841 to 6424. Linking activity has shown a moderate increase of 102 to 142 during 2003-2004.

NEED

Though, the above studies indicate the importance of usage metrics for evaluating online databases and to find out user perspectives, they were simple not comprehensive. They did not attempt to analyze the usage of databases for longer periods to arrive at concrete inferences regarding the usage pattern and users perspectives. There fore, the present study entitled 'The usage pattern of ScienceDirect database in University of Hyderabad: An analytical study' has been undertaken in Indira Gandhi Memorial Library (IGML), University of Hyderabad, with an assumption that the subscription to ScienceDirect increases the availability of number of core journals as well as peripheral journals in the library and their usage is directly proportional to the number of journals available. The usage metrics reflect the various user perspectives of e-journal collections in the database.

OBJECTIVES

- To find out the benefits of ScienceDirect in terms of the coverage of core journals and other peripheral.
- To observe the usage pattern of core as well as other journals
- To study the relationship between the number of available journals and their usage
- To examine the users perspectives of the databases/ portal viz. preferences, requirements and approaches etc.

METHODOLOGY

Among several full text databases available to university library

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the SciVerse ScienceDirect, a full text database is selected as sample for the purpose of the present study since it is multidisciplinary and extensively referred by the university academic community.

For the purpose of study, the acquisition data of ScienceDirect such as number of journals available through database and expenditure was collected for each year from the library records. The core journals coverage in database was identified from the journal renewal recommendations received by the library from time to time. The remaining journals available through database are considered as peripheral journals. The usage data was comprehensively extracted from the Elsevier's admin tool for the period 2002 to 2011. The article usage is described as article full text downloads. However, the usage data of other applications is obtained since the year 2005 and presented in the form of searches, sessions, duration, links, sources, cited documents, abstracts, approaches and number of pages etc. to interpret users perspectives for the period 2005-2011.

SciVerse ScienceDirect

SciVerse ScienceDirect is Elsevier's online platform that has been disseminating scholarly content in Scientific, Technical, and Medical (STM) and other subjects from a group of giant publishers such as Elsevier Scientific, Academic Press, Cell Press and other small publishers since the year 1995 in the form of full text journal articles with back files. The database now became indispensable to the academic community offering journal articles and book chapters from more than 2,500 peer-reviewed journals and more than 11,000 books along with journal archives, books, book series (serial publications), reference collections etc. Currently it is holding more than 11 million articles as well as chapters and growing at a rate of almost 0.5 million additions per year.

❑ Coverage of ScienceDirect Database

Table 1: Coverage of ScienceDirect Database

Year	Database	Coverage		Expend. (in lakh)
	No. of Journals (Collections)	Core Journals	Peripheral Journals	
2002	324 (5)	100	224	19.91
2003	498 (5)	100	398	22.96
2004	490 (5)	100	390	23.97
2005	345 (4)	60	285	27.70
2006	337 (4)	60	277	37.31
2007	780 (6)	124	656	52.13
2008	2120 (21)	133	1987	64.84
2009	2365 (23)	133	2232	87.08
2010	2450 (23)	133	2317	81.73
2011	2500 (23)	133	2367	90.57
	Average	108	1113	50.82

The table 1 illustrate the benefits of ScienceDirect in terms of coverage of core journals and the peripheral journals year-wise and the increase in expenditure over the period. From the table it is observed that the total number of journals increased from 324 in 2002 to 2500 in 2011. Similarly the coverage of core journals increased from 100 in 2002 to 133 in 2011 and peripheral journals increased from 224 in 2002 to 2367 by 2011. The core and peripheral journals were declined during 2005 and 2006 due to the deletion of two collections from the subscription. However it is noticed that expenditure is increased from Rs.19.91 Lakhs in 2002 to Rs.90.57 lakhs by 2011.

Usage Pattern of ScienceDirect

The usage of number of core and peripheral journals from ScienceDirect during the period 2002-2011 was presented in table 2.

❑ Usage of Journals

Table 2: Usage of Journals in SD 2002-11

Year	No. of Journals Used		
	Total	Core	Peripheral
2002	715	79	636
2003	1097	94	1003
2004	1026	100	926
2005	404	89	315
2006	598	99	499
2007	985	107	869
2008	1612	116	1496
2009	1670	118	1557
2010	1780	118	1662
2011	1864	128	1736
Average	1175	1055	1070

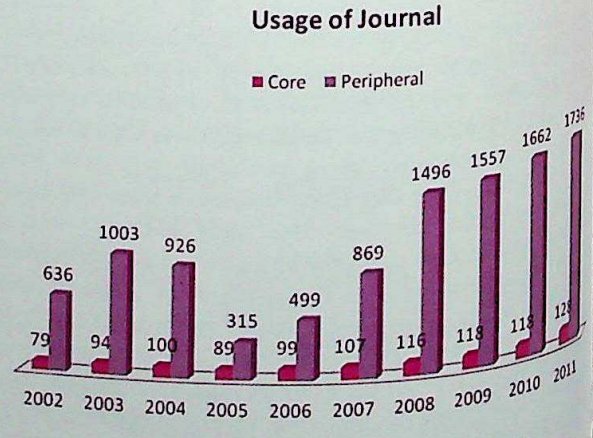

Figure 2: Usage of Journals in SD 2002-11

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From the table and figure 2, it is noticed that on an average 105 core journals and 1070 other peripheral journals were referred from the total available journals of 1175 over the period. The lowest usage of 79 core journals was recorded out of total 715 journals used in the year 2002. Similarly the lowest number of peripheral journals used was 315 in 2005 out of a total of 404. It is important to mention that the highest usage of both core journals 128 and other journals 1736 found in 2011 out of 1864 journals available in the database.

This infers that increase in the availability of journals increases the usage as per individual titles. In other words the usage is directly proportional to the number of journals available.

Usage of Articles

Table 3: Usage of Articles in ScienceDirect

Year	Usage (As per Article full text Downloads)		
	Total (%age)	Core Journals (% in total)	Peripheral Journals (% in total)
2002	14876	6263 (42.10)	8613 (57.90)
2003	44317 (66.43)	18560 (41.88)	25757 (58.12)
2004	49486 (10.45)	21240 (42.92)	28246 (57.08)
2005	33555 (- 47.48)	18573 (55.35)	14982 (44.65)
2006	46802 (28.30)	25234 (53.92)	21568 (46.08)
2007	81311 (42.44)	39024 (47.99)	42287 (52.01)
2008	217559 (62.63)	67645 (31.09)	149914 (68.91)
2009	258598 (15.87)	85971 (33.25)	172627 (66.75)
2010	279092 (7.34)	88908 (31.86)	190184 (68.14)
2011	282095 (1.06)	95718 (33.93)	186377 (66.07)
Average	130769 (20.78)	46714 (35.72)	84056 (64.28)

From the table 3 it is found that the total downloads from ScienceDirect in both the categories of core and other journals constantly increased from 14876 in 2002 to 282095 in 2011 except in 2005. On an average 130769 articles were downloaded during the period at the rate of 20.78% per year. The use of full text articles has been increased in both core and peripheral categories of journals. From the core journals the usage has increased from 6263 to 95718 and from peripheral journals 8613 to 186377 during 2002-2011.

Usage of Articles in Core and Peripheral Categories

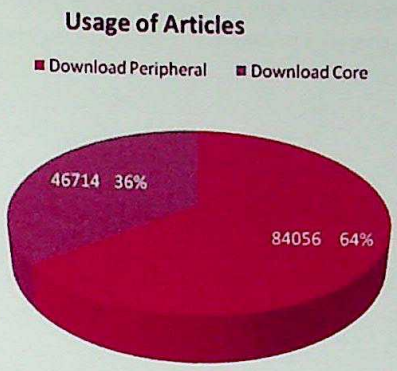

Figure 3: Usage of Articles in Core and Peripheral

On an average 36% (46714) of usage was found from 105 core journals and 64% (84056) from 1070 peripheral journals. The average downloads ratio of core and peripheral journals was 9:16 (36% and 64%) is illustrated in figure 3.

These facts further support the premise that the use of journals is directly proportional to their availability in the database.

Use per Title

The use per title is a significant parameter that indicates relationship between availability of journals for use and their actual usage.

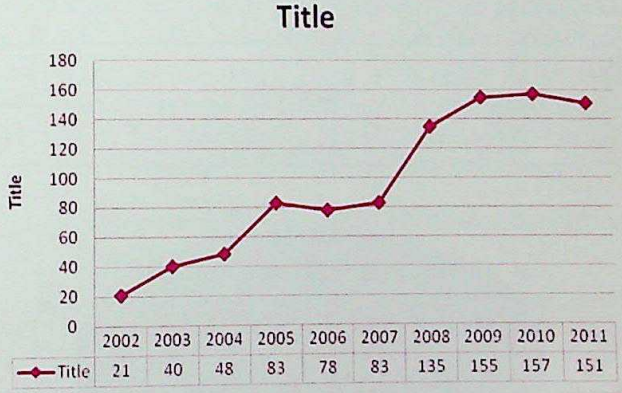

Figure 4: Use per Title 2002-2011

From the above graph, it has been observed that the highest usage per title 157 was found in 2010 and the lowest 21 during 2002, on an average the usage was 95 during the period. The fact infers that the usage of journals increases as per their availability.

Usage of Other Documents

Table 4 illustrates the usage of other documents like backfiles, book series, abstracts and page views, in addition to journals.

Table 4: Usage of Other Documents in ScienceDirect 2002-11

Document Type	Usage
Book series 65 Titles	2605
Back files (archives)	1055
Requests (Unsubscribed Content)	25 to 387
Abstracts	14516 to 54269
Page views	19,223 to 744,64

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The access to book series has resulted in 100% use of entire 03 titles recording 2605 article downloads. The usage of back files (archives) subscribed for the year 2011 as per article downloads was 1055, apart from the occasional download requests observed from the unsubscribed content of the database was ranging from 25 to 387 in 2011. The usage of abstracts according to the counts were ranging between 14516 to 54269 and page views from 19,223 to 44,645 reflecting the use of other components of the database.

Users Perspectives

As mentioned above, the measures of article downloads, abstracts used and pages viewed indicate the usage pattern of ScienceDirect content viz. journals, journal back files and book series etc. The peripheral data that was made available during 2005-2011 reflects several other aspects concerned to the user. They are about sessions, searches, format preferences, method searching approach to the content from the web pages of the database and utility of various applications or services as upd by the publishers of database from time to time.

Users Activity of ScienceDirect

The usage reports available from 2005-2011 shows a tremendo increase in number of users from 8398 to 40084; distinct IPs from 153 to 458; sessions from 26211 to 101906, while the avera session duration has been reduced from 18 minutes to 9 minutes indicating the speed in search, access, or retrieval information from the database. However the search activity users increased remarkably from 21806 to 54569 by 2011.

Preferences for Document Format

Table 5: Download Formats HTML vs PDF

Year / Format	2005	2006	2007	2008	2009	2010	2011	AVERAGE
HTML	7513	10228	26598	67817	92128	93052	103960	57328
%	22.39	21.85	32.71	31.17	35.63	33.34	36.85	30.56
PDF	26042	36574	54713	149742	166470	186040	178135	113959
%	77.61	78.15	67.29	68.83	64.37	66.66	63.15	69.44

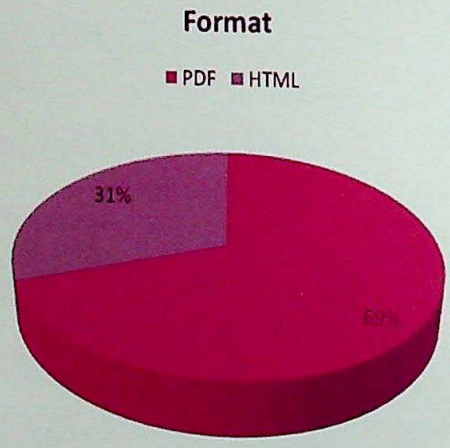

Figure 5: Preference of Document Format in ScienceDirect

The data from table and figure 5 indicates users preference in using the article format of HTML or PDF. The use data when sorted out according to article download formats, HTML or PDF indicated that user's preferred PDF. On the whole 30.56% of documents were downloaded in HTML format, as against 69.44% in PDF.

It is also noticed that the percentage of HTML download has been gradually increased during the period. The reasons for this increase of articles downloads in HTML format can be attributed to user's preference for the easy access of articles as HTML pages and the difficulty of downloading and saving the document in PDF format when there were network disturbances.

Search Preferences

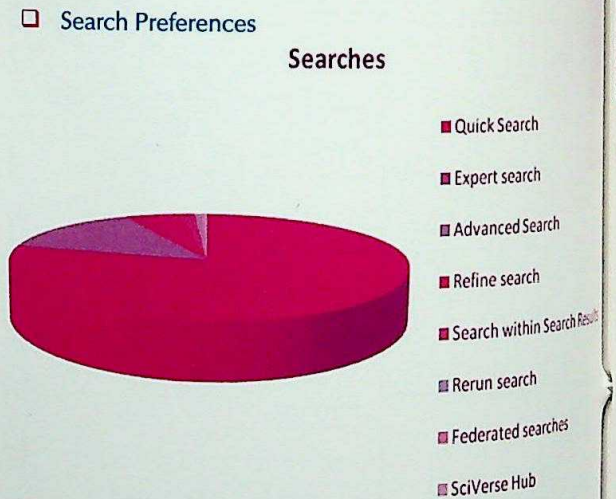

Figure 6: Search Preferences

Among various search methods available in ScienceDirect, the data demonstrate that almost all the search types were attempted by the users for retrieving the required information. Users have excessively preferred quick searches 41768 followed by advanced searches 7813.

Approaches to Science Direct through Other Portals

The data 'entries through portals' indicate the users access ScienceDirect content through other portals. There are more than 30 other portals connecting to SD content. The following table gives the details of each portal.

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Table 6: Approach to ScienceDirect Content through Other Portals

S.No.	PORTAL Title	2010	2011	S.No.	PORTAL Title	2010	2011
1	American Institute of Physics OJPS	1	5	18	Physics of Life Virtual Journal		2
2	Author-Alert	2	6	19	ScienceDirect Citation Alert HTML		1
3	CAS ChemPort	7679	3102	20	ScienceDirect Email A Friend ASCII	30	43
4	Cell Press	3825	4306	21	ScienceDirect Email A Friend HTML	340	429
5	ContentsDirect	1		22	ScienceDirect Marketing Top25	1044	639
6	CPC Program Library	2	11	23	ScienceDirect Search Alert HTML	143	136
7	ECONBase - Promo	3		24	ScienceDirect Topic Alert ASCII	5	14
8	Elsevier Citation Notification Service	23	31	25	ScienceDirect Topic Alert HTML	260	402
9	ExLibris SFX		17	26	ScienceDirect Volume Issue Alert ASCII	16	12
10	FEBS Letters - Phoenix	26	113	27	ScienceDirect Volume Issue Alert HTML	983	667
11	HealthAdvance - Elsevier Health	75		28	SCIRUS	1207	641
12	Inward Linking Hub	36477	100902	29	SciVerse Hub	60	25
13	Iprofs-RSS-Content	1381	1827	30	Serials Solutions - Article Linker	2	
14	Iprofs-RSS-Search	1		31	Society Journals - Computational Stat. Data Anal.	1	
15	ISI Web of Science	1		32	SPIRES Scientific	3	
16	NextBio SD	62	103	33	The Lancet	31	21
17	Openly 1Cate		3				

FINDINGS AND CONCLUSION

- Though the cost of ScienceDirect increases from Rs. 19.91 lakhs (2002) to Rs.90.57 lakhs (2011), there is a benefit of 133 core journals and 2367 peripheral journals by 2011 to the university academic community.
- On an average 105 core journals and 1070 peripheral journals are used.
- The full text article downloads from core journals increased from 6263 to 95718 during 2002-2011 at the rate of 35.72%, whereas the downloads from peripheral journals increased enormously from 8613 to 186377 with on average 64.28%.
- Usage statistics of ScienceDirect further revealed that several other series like books, back files of journals, abstracts, unsubscribed content etc were also referred extensively.
- From the side of users, it is found that the number of users increased from 8398 in 2005 to 40084 by 2011. Similarly IPs also increased from 153 to 485, searches from 21806 to 54569 and sessions from 26211 to 101906.
- Users preferred PDF format and downloaded 69.44% of articles in this format, while 30.56% were downloaded in HTML format.
- Among searches, users preferred quick search 41768 followed by advanced searches 7813 and refined searches 2739.
- Finally from the usage statistics it is amazing to note that the users referred ScienceDirect content through 33 other portals also.

In short the usage statistics of ScienceDirect revealed that the database was extensively referred by university of Hyderabad academic community. The availability of core journals and the extensive usage of peripheral journals indicate that the ScienceDirect database is indispensable to the user community.

SUGGESTIONS

This study is representing the evaluation of ScienceDirect database as per the most important criteria such as the availability of journals, coverage of core titles, the usefulness of peripheral journals available in highly expensive journal collections and other valued applications offered by database publishers. The kind of analytics would help in taking decisions during subscriptions, renewals. Further it helps library administrators to understand and redesign access environment according to user's preferences, approaches as well as devices.

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Similar studies can be undertaken for other databases also to make decisions for renewals by not only academic institutions but also by the research organizations or even consortia.

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Digital Resources and Preservation: An Overview

Mehar Singh* and Ashok Kumar**

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*Deputy Librarian
DCRUST
Murthal- Sonepat
** Librarian, MMIMSR,
Mullana

Corresponding Author
Mehar Singh
mehar859mukesh@yahoo.co.in

ABSTRACT

The Library and Information services of the 21st century are fast changing with the swift development of digital publishing. The libraries are not only acquiring printed material but also providing various learning resources in digital form. The present article deals with the online digital resources, advantage and needs of preservation, infrastructure required for preservation in Indian environment.

KeyTerms: Digital Resources, Digital Preservation, Informational Technology, IIS, NIC, DRTC.

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INTRODUCTION

With the advent of information technology new ideas and subjects have become in the modern age. The digital resources are playing most important role in the area of education to provide better services and easy access. Due to explosion of information and knowledge, the digital resources have become more powerful tools that allow users to search the information more effectively and efficiently. The digital resources have become most important aspects of a digital library, which changed the format of information from printed to digital form. With the help of digital resources the users get more information within second and achieve their aim. The development of digital resources has presently become a very common source for information seekers.

DIGITAL RESOURCES

The resources which are published in digital format and read by a computer are digital resources. Digital resources usually consist of e-books, online Journals, online databases, Institutional Repository, OPAC and Web OPAC, website, e-thesis and e-dissertation, CD-ROMs etc. Therefore, the resources which are available online in digital formats are called digital resources. The digital resources can be used by users through online access. Here we are describing some online digital resources which are useful for academicians, research scholars and LIS professionals.

❑ E-Books

The Oxford Dictionary of English defines the e-book as "an electronic version of a traditional printed book" (http://en.wikipedia.org). The e-books are usually read by using a personal computer/desktop and even smart phone also. Usually, some e-books can be downloaded free or at reduce cost through online digital resources. In technical education ground, some leading publishers such as Wiley, TMH, etc are producing e-books.

❑ Online Journals

Online Journals are also known as electronic Journals that can be accessed by the use of internet or e-transmission. The online Journals are usually published on the web and providing information for Academicians, Research Scholars and LIS Professionals. The articles can be downloaded by the users through online digital resources. Many publishers provide free access to online Journals against the print subscription. In the Technical Education ground, some leading publishers such as Elsevier, Blackwell, Wiley, Taylor and Francis, MC Graw Hill and Springer Link are producing online Journals.

❑ Institutional Repositories

DSpace and Greenstone are two most popular free and open source software for the development of Institutional Repositories. The Open Source Software DSpace was developed by MIT and HP dedicated to scholarly community in creating a digital repository of an institution. Green stone (OSS) developed by New Zealand Library Project in association with University of Waiko and distributed under the help of UNESCO that can be freely downloaded from internet, Panneerselvam (2012). The creation of digital repository, digitizing of printed collection and their dissemination successfully carried out by using the DSpace and Green stone OSS (Open Source Software).

Institutional Repositories are the doors which assist to access the institution's own research output. The Institutional Repositories are preserving and disseminating the information in digital form of an institution on public domain for worldwide access, Dangi, et.al. (2012).

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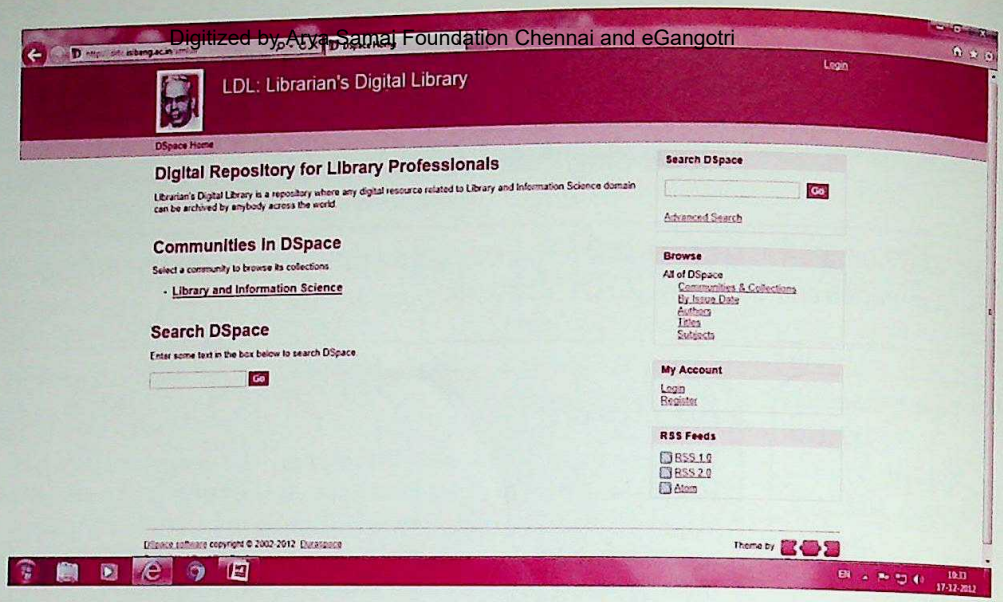

Figure 1: Subject Specific Repository for LIS
Source: http://drtc.isibang.ac.in/

In India, there are so many Institutional Repositories developed by research and academic institutions which contain useful information for academicians. The Documentation Research and Training Centre (DRTC), Bangalore is an example of a subject-specific repository for LIS professionals (http://drtc.isibang.ac.in/).

Some popular Indian Library and Information Science Repositories are as under:

ISI,Banglore	http://library/isibang/ac/in /8080/dspace
IIM, Kozhikode	http://Dspace.iimk.ac.in
INFLIBNET, Ahmedabad	http://dspace/inflibnet.ac.in
IIT, Delhi	http://eprint.iitd.ac.in/dspace
IIS, Banglore	http://etd.ncsi.iisc.ernet.in/
DRTC, Banglore	http://drtc.isibang.ac.in
NIC, New Delhi	http://openmed.nic.in
DOAJ	http://www.opendoar.org

❑ OPAC and Web OPAC

Online Public Access catalogue (OPAC) is an online database material held by the library including books, Journals, etc. The first large-scale online catalogue was developed at Ohio State University in 1975. (http://en.wikipedia.org). In OPAC, all the bibliographical information is displayed on computer by author, title, publisher place and etc in a read only format. Below example with screenshot is the Web OPAC of Indian Institute of Technology, Bombay (http://www.library.iitb.ac.in/newsearchbook/opac).

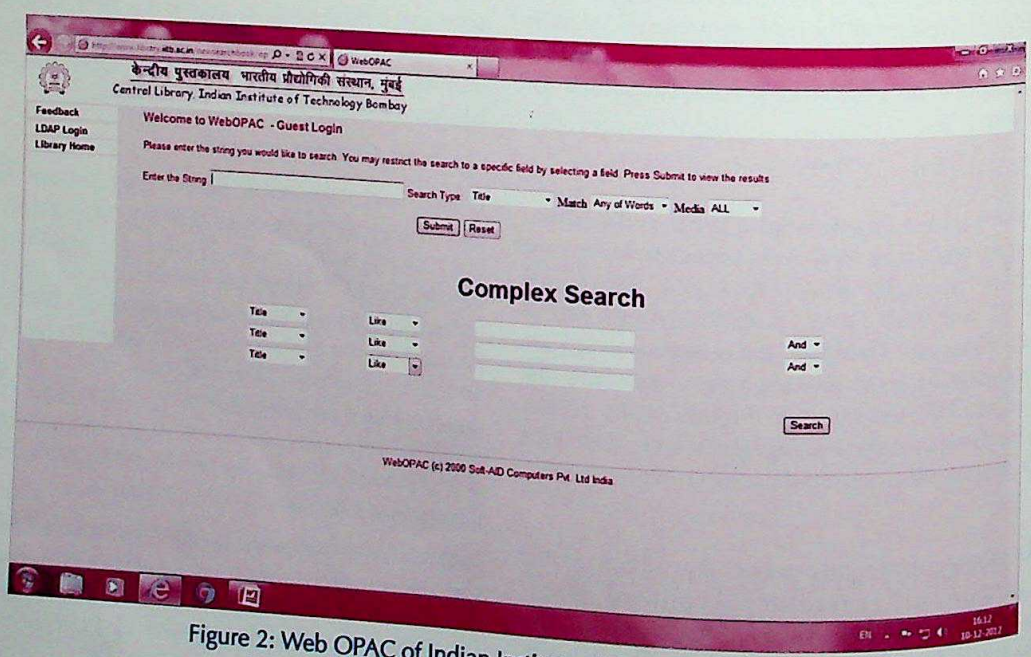

Figure 2: Web OPAC of Indian Institute of Technology, Bombay
Source: http://www.library.iitb.ac.in/newsearchbook/opac

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The web OPAC helps a user to browse entire document collections on internet of the library.

Website

A website is a collection of World Wide Web (WWW) files includes home page, images, videos or other digital materials that are address connected to a Universal Resource Locator (URL). By giving an address of an institution or individual users get more information about that particular University or institution. An example with screenshot the website of Deenbandhu Chhotu Ram University of Science and Technology, Murthal, Sonepat, Haryana (www.dcrustm.ac.in).

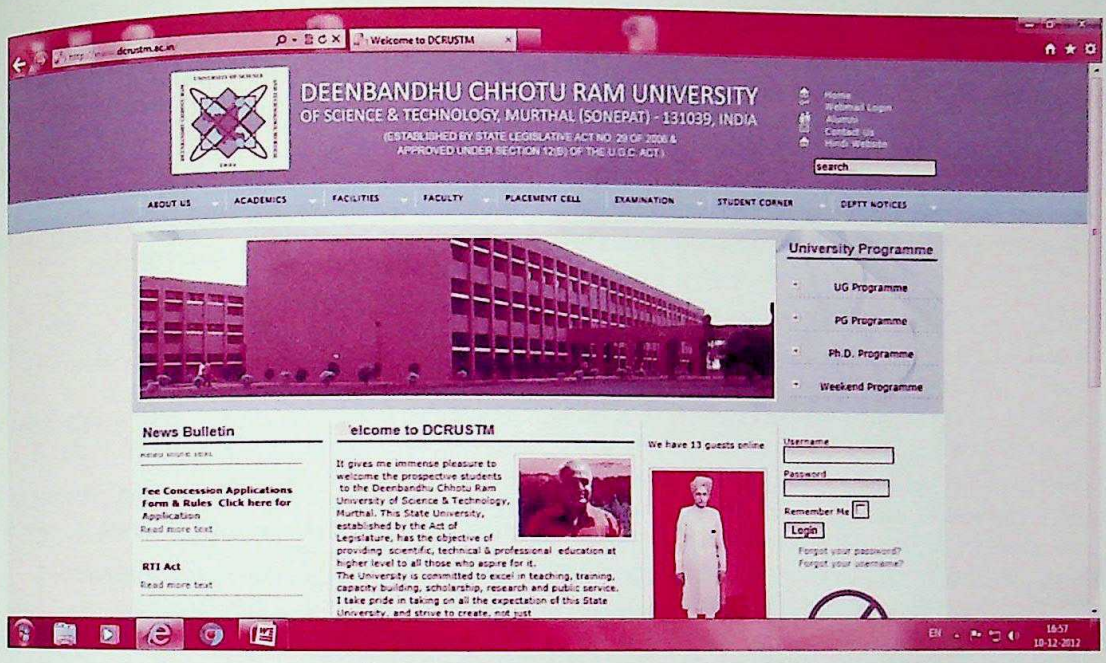

Figure 3: Website of DCRUST Murthal
Source: www.dcrustm.ac.in

A website is hosted at least one web server which accessible through internet or LAN.

ADVANTAGE

- The online digital resource can be accessed anywhere on desktop/ notebook computer.
- Any correction and modification can easily be done in them.
- One of the most important advantages of online digital resources is multiple access of document. For example a manuscript is in physical format, then it can be handled by only one person in a specific period, but through the online access, many users can access the specific document at a time, Pandher (2012).

DIGITAL PRESERVATION

Digital Preservation is a process by which digital data is preserve in digital form in order to make sure that digital information of continuing value remains accessible and usable. The preservation of digital resource is involving way to maintain digital heritage culture.

WHY PRESERVE DIGITAL RESOURCES?

Due to the significance of digital resources it has become the important process in this information society to preserve the digital resources for our future generation and their use. The digital preservation is required due to some following reasons, Devi et.al. (2012):

- To provide worldwide accessibility.
- To maintain the information for future.
- To save the space and time of users.
- To preserve the traditional knowledge.

TOOLS REQUIRED FOR DIGITAL PRESERVATION

The following IT components are making available for the preservation of the digital collection:

- Personal Computer
- High Speed Processor
- Large Random Access Memory
- Hard disk with large space, Pen Drive
- CD drive (Read and Write)
- Modem, Scanner, Monitor
- Web Cam, Video Camera
- Open Source Software (OSS)

DIGITAL PRESERVATION IN INDIA

India is a country which is having vast cultural heritage resources. The concept of digital preservation has been introduced in India very lately in 2008. National Digital Preservation programme of India was initiated by Ministry of Communications & Information Technology in 2008, Devi et.al. (2012).

In India, most of the institutions thought to develop consortia

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based subscription of Journals for online access and preservation of information and knowledge. The libraries having largest collection of e-resources subscription through various consortia such as UGC-INFONET http://www.ugc.ac.in, INDEST Consortium, HELINET (Health Science Library & Information Network) http://www.rguhs.ac.in, FORSA (Forum for Resource sharing in Astronomy & Astrophysics) http://www.iiap.res.in and CSIR (Council of Scientific and Industrial Research) http://www.niscair.res.in .

CONCLUSION

There is no one any single library to acquire all the current knowledge and fulfil the requirement of their users without help of digital resources. These digital resources are satisfying the information needs of the academician, researchers and LIS professionals.

To save the valuable information and fulfil the requirement of the users, digital resources should be preserved and maintained. In our country, most of the libraries are facing so many problems in digital preservation as lack of fund provided to them. To provide the better services through digital resources to the users, Indian libraries to explore various option to create models for digital preservation of e-resources. Government of India, UGC, Consortia of the Country, INFLIBNET and other Universities/Institutions should take more steps for digitisations and their preservation. The Digital resources will not survive or remain accessible without their preservation.

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Collection and Management of Information Resources: A Case Study of Deccan Herald and Prajavani Newspapers Library (Karnataka)

Sarojadevi K* and Padmamma S**

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*Assistant Librarian
Karnataka University's Karnataka College Library
Dharwad-Karnataka
**Associate Professor
DLIS Kuvempu University,
Shankarghatta,
Shimogga- Karnataka

Corresponding Author
Sarojadevi K
saroja.kumbargoudar@gmail.com

ABSTRACT

Newspapers provide current information on all aspects of country's social, economic, political and cultural life. They are the reflection of the society. The press makes a direct and visible impact on the operation of the administration and political systems of the country. The basic objective of a newspaper library or "morgue" is to act as repository of information required by the reporting and editorial staff and management departments of a newspaper organization. Newspapers bring every person into touch with the active world. The present paper deals with the existing patterns of collection and acquisition, its organization, management and retrieval of information resources preserved in the library. The information is usually stored, but more important is to organize the collection in such a way that needed information can be retrieved immediately. Consequently the case study of 'Deccan Herald' a popular daily English Language newspaper library and Prajavani Kannada Language newspaper library have been undertaken.

KeyTerms: Mass Media Libraries, Collection Management, Preservation, Information Resources.

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INTRODUCTION

In the present age, vigorous advancement of information and communication technology has brought revolutionary changes in the collection, organization and management of information. Newspaper Library is a special library, in a way as its collections are different and it is accessed to its employees only. They are the mediators of social and economical change and also the creators of attitude and situations. Newspaper libraries uniformly followed their owners' "private" information systems increasingly isolating themselves and their usefulness until the postwar information society. The updated current information enables to expand markets for the newspaper, Information infinitely changed newspaper libraries into mainstream information businesses. The more efficient a newspaper can relate and tally past information on a subject, person or collection of information with current information, the more effective it will be. The library and information center plays a vital role in linking events to its background and is the backbone of a newspaper establishment. Collection of information resources and managing it for a long term is very important to Newspaper libraries.

NEED OF NEWSPAPERS LIBRARY

Newspapers serve to record the daily lives of people and the world around them, newspapers are also a rich source of cultural and social information. Newspapers are still the most iconic outlet for news and other types of written communication. Newspapers record, print and publish stories of events that are of importance to the society at any given time. They are authoritative and credible records of the significant issues and events as and when they occurred. They provide excellent memories of a country's historical events and landmarks. They are sources of textual evidence useful to students, researchers, journalists, administrators, lawyers. Politicians and the larger society The Newspapers library allows access to reports, press releases, background information documents, videos and audio clippings. Lou Thomas identifies reasons for establishing Newspaper libraries as follows:

- Centralization of Resources Access to both Traditional and New Information Skills of Libraries.
- Provision of Background Information for Sew stories.
- Accuracy in Reporting and Editing.
- Saving Time of Reporters and Editors and Recycling of Information, Mahapatra (2007).

REVIEW OF RELATED STUDIES

In this age of information, we have to look at the process from the perspective of information and communication. Media libraries are developing leading to changes in Information and Communication technology infrastructure facilities, the tools

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used to manage the library collection and services provided to users.

The authors Panda, K.C. and Swain, Dilip K made an attempt to make the user community aware of e-news services offered by different e-news channels all around the world, along with history and developments of e-news services, news papers websites and latest advantages of e-news in the electronic era, Panda et.al. (2011). Emphasis on "physical preservation of newspaper resources in the Libraries of India". Explores about physical preservation of news papers and various techniques of physical preservation of pictures, maps, graphics materials etc. are dealt in detail, Riyajuddin et.al. (2011).

The authors Vijetacharya, and others explored the awareness of process of Protection and Preservation of library Newspaper and to store the knowledge bank in the long term preservation. The effects of relative humidity on Newspaper, possible causes, precaution to protect the physical preservation in news paper industry and suggestions for long duration are dealt in depth,Malvia et.al. (2011). Sutar, Dhananjay B, . Gurav, Dhananjay S and. Birje, Sunil R examines a systematic approach towards the effective use of information available in newspapers which is available in both traditional as well as in online form in the paper entitled "Digital preservation of newspaper resources: a systematic approach for traditional and online newspapers", Sutar et.al. (2011). Shailendra Kumar and Ranjeet Singh Thakur made a comprehensive study of the history of Television and Telecast media libraries in India and also give a clear picture of the past, present and future of media librarianship, Both the papers highlighted on media libraries, Shailendra et.al.

As there were no studies conducted on this topic, the present study was undertaken to examine the collection and management of information resources in Newspaper library. A case study of 'Deccan Herald' and "Prajavani" popular English and Kannada Language newspaper library were undertaken.

OBJECTIVES

The major objectives of the study are:

- To Know the Collection of Information Resources of a Library
- To Know the Library Information Services to Their Users
- To Know the Existing Physical Facilities of a Newspaper Library
- To Know the ICT Infrastructure and Identify the Status of Digital Collection Management
- To Examine, the Current Status of Preservation and Conservation of Newspaper in the Library
- Examine the Organization, Maintenance, and Long Term Preservation of the Information Resources in the Mass Media Libraries

METHODOLOGY

The present study used structured questionnaire followed by interview of librarian and the library staff along with observation method to bring out the simplicity to the study.

The data so collected was represented in terms of tables.

The media of Karnataka (India) has a long and distinguished track record. First published from Mangalore, Kannada Samachar was the earliest Kannada publication according to many Scholars. But others think that the Mangalore Samachar, the very first Kannada newspaper, which was first published in the year 1 July 1843 under the editorship of Herman Moegling of the Basel Mission. The Deccan Herald in English and the Prajavani (Kannada for Voice of the People) in Kannada were started by The Printers (Mysore Private Limited) in 1948, which brought about a revolution in Karnataka newspaper publishing. The popular dailies published from Karnataka are Prajavani, Samyukta Karnataka, Vijay Karnataka, Kannada Prabha and Hosa Diganthu http://www.indfy.com/karnataka/media.html.

Some of the best newspapers in the country come from Karnataka. The newspapers of Karnataka come both in Kannada and English languages. Though television, radio, etc. have been other modes of media through which people gather news, it is the newspaper which is still a hot favorite amongst everyone, and they enrich the Karnataka media.

The Deccan Herald is the oldest surviving English newspaper in Karnataka. It is extremely popular in the state and can be said to be a major voice in the print media of Karnataka. The Hindu is another English newspaper which is read by many youngsters these days, both within Karnataka and other parts of India. Other important newspapers are the Star of Mysore and The New Indian Express, which also have large fan followings as far as readership are concerned.

Some other Kannada newspapers are the Kannada Prabha and Prajavani, which are published by the New Indian Express and Deccan Herald publishers respectively. Sahilone is the only newspaper which comes in Urdu language and it caters to the readership of the Muslim population in Karnataka, many of whom speak this language.

Deccan Herald

The Deccan Herald is one of the renowned newspapers of India ruling the market in the state of Karnataka. In fact, The Deccan Herald is the largest English language daily newspaper in the state. Also called the 'DH', its first edition hit the streets on June 16, 1948 by K. N. Guruswami. It offers a number of editions from Bangalore, Hubli, Mysore, Mangalore and Gulbarga. The head office is located in M.G.Road, Bangalore. Some of the supplements of the DH are: Metro life, Economy and Business, Science and Technology, Spetrum, Avenues, Sportscene etc.

Prajavani

Prajavani had a circulation of 565,000, making it one of the largest-circulated newspapers of Karnataka.

Deccan Herald and Prajavani on Web

The Deccan Herald launched its Internet edition on April 15, 1996. Today, The Deccan Herald has its online edition and epaper. Online editions of the group can be accessed through

http://www.deccanherald.com - online edition The Deccan Herald

http://www.deccanheraldepaper.com - e-paper The Deccan Herald

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http://www.prajavani.net- A Kannada language online daily

Library of Deccan Herald

The Library was started along with the establishment of Newspaper in the year 1949. The vision and mission of the library on the Library information guide is "Information Centre- Preserving Yesterday, Informing Today & Inspiring tomorrow",

The Library Motto or Mission statement is to Preserve and build the information resources to meet present and future needs of their staff members by providing the up-to date information. It has a separate section to facilitate user for information seeking and accessing online journals for their day to day editorial work. The account given by a journalist in news report must be accurate, factual and free of personal or social bias. The acquisition of books is done as and when the requirements come from the reporters and editorial staff. The Accession register is maintained in the Library. E-lib software is used for Library Management and books are shelved subject wise like poetry, drama, novels, general books and reference books such as Dictionaries and Encyclopedias. Due to space problem only essential books are retained and other books are donated to school and college libraries.

- **Preservation:** Access to information is an essential part of knowledge society. Throughout history, libraries and archives have been guarding the documentary heritage of human kind. In order to fulfill the needs of their company, preservation of their own publication in print, micro, and digital form is most essential.

- **Hardcopies:** Hard copies of Deccan Herald and Prajavani (City edition) hardcopies are kept in information centre for one year for easy reference.

- **Binding:** All editions of Deccan Herald & Prajavani are collected. This is kept in record room for very essential reference and emergency use.

- **Microfilm**

Table 1: Availability of Back Volumes of Microfilms

Publications	Availability of Microfilms
Deccan Herald	17th June 1948 onwards
Prajavani	Feb 1950 onwards
Sudha	Jan-1965 onwards
Mayura	1968 onwards
Saptahika Puravani	1982 onwards (As separate collection)
Sunday Herald (Deccan Herald)	1985 onwards (As separate collection)
Evening Herald	May 1983 to Aug 1986
Herald Review	May 1984 to Aug 1985

Microfilms are available in a variety of models. Microfilming of bound volumes of newspapers is the usual first step in the preservation of the published record. The advantages of Microfilming are it reduces space, easy duplication, better security and multiuser at a time.

All editions of deccan Herald & Prajavani are collected and microfilmed. Separate microfilm rolls of deccan herald, prajavani, and Sunday Herald are preserved for easy search & accessibility. Sudha, Mayura, Ugadi & Deepavali Special issues are also microfilmed. Table 1 shows, details of availability of microfilmed resources

- PDF Backup: Information center is preserving the digital backups of all their publications in PDF format in CDs and DVDs.

- **Library Collections**

Newspaper Libraries perform the functions more of reference library than that of any other academic or public libraries. The collections of these libraries are mostly confined to reference sources that primarily serve the information needs of the journalist. The collection of the newspaper libraries includes the resources which caters the needs of its users and order to meet the organizational goals.

The Deccan Herald library & information centre has nearly 25000 books. The collection consists of reference books such as Dictionaries, Encyclopedias, Gazetteers, Law compendiums, General books and nearly 3000 books of Kannada Literature are available such as poetry, drama, criticism, literary works, and biographies of important personalities. About 100 national and international periodicals are subscribed. Back issues of some important learned journals are preserved in the information centre.

- **Photograph Collection**

There is an old saying that a picture is worth a thousand words. Many facts that cannot be described fully in words, many objects that are beyond words, can be presented with the help of pictures. Photographs add authenticity and realism to descriptions, Vilanilam (2005).

Table 2: Photograph Collection

Particulars of Photographs	Copies
Hard copies	1,25,000
Digital Copies (Scanned form)	1,00,000
Digital Copies (Quark DMM software)	1,75,000
Miscellaneous (Negatives film strips, Transparency etc.)	1,000

The table 2 shows, Deccan Herald Library information centre has very good collection of photographs. Above table contents implies information centre has got a rich collection of born digital photos which are preserved in Quark DMM software, in the long run hard copies are prone to damage or colour may faint. But digitalized or born digital photos can be used lifetime and even editing and modifications will be easy and quick. It is good move towards digital resource management process.

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- Newspaper Clippings

Table 3: Record/Availability of Newspaper Clippings

Clippings for	Period
Karnataka	Since 1989
India	Last 2 years
Other Countries	Last 2 years
States	Last 2 years
Commerce	Last 2 years
Personalities	Since 1984

Newspaper clipping service is one of the information services. It is popular and beneficial with growing demand and popularity. If this nascent information in its primary form is organized, it is useful to the information needs of the editorial staff. It also has Kannada & English newspaper clippings arranged subject wise since 1989.Table 3 shows the major categories of newspaper clippings available in Deccan Herald Library and information centre.

- Users

Chief Editor and all official staff including correspondents are users of Newspaper Library. Editorial staff consults the information sources to check the facts, refer press clippings of particular events or issues and verify the essential documents, and for background information. Newspapers are the original or primary sources of human thought and knowledge in various fields of human endeavour.

Information in the Newspapers is generally authentic and if any wrong or misleading information may damage the reputation of the newspaper organization. The permanent employees of Deccan Herald and Prajavani are the only users of the library. They also visit the library for the purpose of recreation and general reading. All permanent employees of the company can be become the member of the information centre.

- Library Services

Newspaper Libraries serve limited users and are usually confined to the permanent employees only. The services are primarily confined to reference. They provide information more on 'fact finding or checking' information spelling, dates, bibliographical and background information. The application of information technology is yet to spread its influence on the Newspaper Libraries. Newspaper cutting collection popularly knows as press clippings service assumes greater importance than any other service in the newspaper libraries. Sometimes people also consult the newspaper library in case of legal cases published in the old newspaper. The librarian provides the photocopy of that article with reasonable fees. Information centre handle queries of all information requirement of editorial and other departments of the company. Relevant books, periodicals, clippings, pages, photographs are retrieved as and when required.

- ICT Infrastructure

Mass media Libraries are now part of a global and competitive environment to give their quick and best service to the society. To delivery quick and efficient service there is a need of well organized and in-house manageable Information and communication technology infrastructure.

Table 4: ICT Infrastructure

IT Services in Library	Yes/ No
Client server based architecture	Yes
Servers support	Yes
Desktop/workstation support	Yes
Network support	Yes
File management and storage	Yes
Backup and disaster recovery	Yes
Centralized hardware and software acquisition and maintenance	Yes
Firewall, Security and protocols (authentication, authorization, etc.)	Yes
Internet provision to all library users	Yes
IT applications for digital collections management	
Digital imaging (for example, scanning, direct digital capture, digital photography)	Yes
Digital Collection management system	Yes
Digital resources and asset management system	Yes
Open sources software adoption (Fedora/DSpace/Linux. .Etc..,)	No

In table 4 options had been provided to know the current status of information and communication technology infrastructure and IT based services in library and information centre of Deccan Herald. It can be concluded that there is client server based architecture , centralized hardware and software acquisition and maintenance, firewall, and security protocols and web based services to their users.

FINDINGS

- The Organization is publishing Deccan Herald English and Prajavani Kannada language newspapers, Sudha a weekly and Mayura monthly in Kannada language.
- All editions of Deccan Herald and Prajavani are collected and microfilmed.
- The editorial department receives books from authors and publishers for review purpose. The selected books are sent for reviews and remaining books are sent to the information centre.
- The Library and information centre services are restricted to members only.
- The information and Communication technology infrastructure facilities in the library & information centre are in a well developed stage.
- Almost 90% of digitization and preservation of traditional information resource are already completed

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and remaining is under progress.

- All Library operations are computerized using library automation software EASYLIB.
- Digital resource management is established using Quark DMM (Digital Media Manager).
- They have established well developed strategic policies for management of digital resources.
- Paid information service is provided to public on demand.

CONCLUSION

The role of newspaper libraries is changing as is the way in which they relate to the rest of the newspaper world, and the changes are being driven by two forces one is developing technology and economics. Technology has introduced new ways of storing and retrieving information, and has made possible a vigorous information industry. The newspaper library is pro-active, dynamic and entrepreneurial. It is deeply immersed in and parts of the editorial process, with a close and active involvement in the daily routines of writing, editing and producing a newspaper. Digital preservation offer enormous opportunities, options, convenience, flexibility and improved efficiency to the users. Library automation and preservation can be done using open source software's like Greenstone, Dspace, Calibre etc with the existing resources and giving efficient service to the users of the library. Apart from the existing technology Library professionals can move towards 'cloud computing', so that there is no question of obsolete of technology, technology refreshing, migration and professionals can deliver even better service to their user with professional touch.

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Journal article from an Electronic Database

Krebs, D.L. & Denton, K. (2006). Explanatory limitations of Cognitive development approaches to morality. *Psychological Review*, 113(3), 672-675. Accessed on 20.04.2007, PsycINFO databse (2006-08257-012)

Articles from online Journal

Vasper, J., Haak, S. & Nikkhah, G. (2007). Subthalamic nucleus brain stimulation in elderly patients-analysis of outcome and complications. *BMC Neurology*, 7(7), 1-9. Accessed on 20.04.2007, http://www.biomedcentral.com/content/pdf/1471-2377-7-7.pdf.

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Perceptions and Feedback of LIS Professionals towards Internet Resources on Marketing of Library Services

Anna Kaushik

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Deputy Librarian
Central Library
University of Kota
Kota- Rajasthan

Corresponding Author
Anna Kaushik
drannakaushik@uok.ac.in

ABSTRACT

This study aims to obtain perception and feedback of LIS marketing professionals regarding marketing activities, searching and finding internet resources on marketing of library services area through online questionnaire. The results of this study revealed that in "Marketing Library Service", Google and Yahoo emerged as most effective search term and search engines for searching and finding information on marketing of library services on Internet. About 43% respondents fetch information about marketing library services from their colleague if they don't find desired information on Internet This study will be helpful for information seekers and LIS professionals in order to identify search patterns and usefulness of internet resources available on marketing of library services area.

KeyTerms: LIS, Internet Resources, Search Engines, Feedback, Perception, Marketing Library Services.

Received On: 02.12.12; Revised On: 3.06.13; Accepted On: 05.09.13

INTRODUCTION

In the present era, Internet becomes a main reservoir to access information for variant purposes. Origin of several internet and information technologies, variety of internet resources has been developed and available on different platforms and formats. Hawthorne[3] said that wide use of web based electronic information resources begun in the mid 1990's. Internet resources may be defined as information sources developed for specific purpose, particular targeting to a specific groups and available on Internet. These Internet resources mainly available on two platforms namely paid and free. On paid platform, one has to pay some amount for accessing internet resources and on the other hand, one can access these internet resources free of cost, thus, these free internet resources also known as open resources. Open access resources are gaining popularity by various open initiatives taken place after 1990s. But, nowadays, many open access resources are available on internet that contain worthy library and information science literature on subject specific area. On the other hand, search engines also considered as imperative tools for retrieving information hence Information seekers often used search engines to get desired information for various tasks but searching and finding relevant information from search engines is a really challenging job. Search engines produce different results in form of several types of internet resources and file formats.

Marketing concepts have proven their significance in terms of promoting library services as well as products and exploring information to right users at right time, therefore marketing theories and techniques very much adopted by every library and information centre globally. Thus, various open access resources such as websites, electronic journals, blogs, wikis, podcasts, online bibliographies, electronic books and so on, have been developed which impart information exclusively on marketing of library services area free of cost. Feed back and perception is always helpful in building successful products services and received various valuable personal opinions of users which may be used for developing remarkable products and services.

OBJECTIVES

This study consists following objectives:

- To obtain feedback from potential users regarding availability of internet resources on marketing of library services.
- To catch the perception of LIS marketing professionals with regard to marketing library services related activities and retrieving information through selected search engines.
- To obtain feedback towards internet resources on LIS marketing in terms of relevancy, currency, reliability, accuracy and alternative means.

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- To suggest effective measures for improving of Internet resources on marketing of library services.

SCOPE

This study mainly focused and confined to only 50 library and information science professionals who actively involved and have authority in the area of marketing library and information services. The perception and feedback of selected 50 LIS marketing professional taken on the basis of online questionnaire framed for this purpose. The selection of 50 LIS marketing professionals made on the following parameters:

- LIS professionals who have their own websites, blogs, and other web resources that are imparting information regarding marketing library and information services.
- Library and information science practitioners who actively involved in LIS marketing and associated with LIS associations which involved in marketing library and information services related activities and developed separate sections for marketing library services area.
- LIS people who have written book chapters or articles in library and information science subject related journals.
- LIS professionals who have written and edited any book on marketing library and information services focused area.

LITERATURE REVIEW

Different studies on the marketing of library services were carried out on the issues such as LIS professional attitudes, specific group studies, open access resources, web based electronic resources and search engines as well as search terms. Xia[14] examined the conductivity of two Facebook groups namely Indiana University and Rutgers University towards LIS marketing and found that successfulness of Facebook groups depend on actively participation of organizations' librarians and alive discussions. This study has further suggested that Facebook groups should include students as well as faculty and staff members. Xia[15] conducted a longitudinal study of scholars attitudes towards open access electronic journals published from early 1990s and highlighted the weakness of open access e-journals for open access advocators. Zhang[16] examined the use of web resources in 30 scholarly journals in three different disciplines such as science, social science and humanities and discovered that web resources were not much used in journal articles but number of web resources had increased. Above study also suggested that new strategies should develop in order to manage web based information resources. Zhang[17] also investigated the use of Internet-based electronic resources by library and information science researchers for scholarly contributions. Robinson[9] discovered the impact of new forms of information resources, viz. weblogs and wikis in the literature of toxicology. A survey conducted by, Palmer et al. regarding attitude of academic librarians about open access principles and related behaviours and found that academic librarians have quite positive attitudes towards open access but wide differences was noted in funding and library supported open access initiatives. A focused group study was carried out by, Candela Ollé[2] based on seven staff members of five Catalan academic libraries for getting perceptions for use of electronic resources and identified that use of electronic journals increased but librarians were encountered various problems such as platform break downs, difficulties in accessing resources off-campus, and discontinued resources. Kaur[4] analyzed the attitude of library professionals in connection to marketing concepts and its implementation in the libraries through questionnaire and interview method and discovered that most of library professionals showed positive attitude for marketing and also in favour of having marketing logo, mission statement and marketing professionals in their respective libraries but in real situation none library found to have all above mentioned parameters related to marketing concepts and techniques . Singh[12] investigated the marketing culture underlying in Finnish research libraries and discovered that there are three kinds of marketing cultures found which includes the strong (the high flyers); the medium (the brisk runners); and the weak (the slow walkers) on the junctures of analyzing the libraries' marketing attitudes, knowledge, and behaviour permeating their organizations. Mi[8] urged to apply classic marketing principles and strategies in order to add value in the library services and products. Kaushik's[5] study also urges to pursue marketing library services, search term and Google search engine to searching and finding information marketing library services subject. Sandhu[10] conducted a survey study on the basis of questionnaire regarding use of open access resources by engineering students of Punjab (India) in which 460 respondents participated and discovered that most of respondents were familiar with open access resources particularly open access journals, institutional repositories and self-archived materials available on the web. But open access journals were more use in comparison to other open access resources. The 78% respondents also indicated that open access would lead to easy accessibility of paper and benefited them. Another interesting study was carried out by, Kennedy[6] expressing role of marketing techniques with regard to promote electronic resources of the library and successes or failures of marketing plans by using the corpus composed of 24 documents published from 1994-2006 through which 38 unique marketing techniques were discovered among which four marketing techniques viz. patron training in group setting, flyers/brochures, emails to patrons, and surveys found most popular. Shontz et.al.[11] Investigated the attitude of public librarians of The New Jersey Library Association (NJLA) to marketing of library services by questionnaire and found that perhaps, maximum respondents had positive attitude towards marketing library services but library administrators, librarians who had taken a course or workshop in marketing, and those who perceived marketing to be a high priority in their libraries expressed more positive attitudes toward LIS marketing in contrast to other respondents. As such no study so far carried out on the perceptions and feedback regarding searching and finding internet resources on marketing of library services.

METHODOLOGY

To know about the perceptions of the LIS professionals involved in marketing library services, a questionnaire survey was conducted to obtain their feedback. For this study, an online questionnaire containing 18 questions was developed with help of free website namely "Kwiksurveys" (http://www.kwiksurveys.com/) exclusively available on internet which facilitates to build online questionnaire freely. This online questionnaire was sent to a focus group of 50 LIS professionals involved in the area of marketing library services. The professionals were selected on the basis of well known experts who have authored papers, books or maintain blogs on marketing

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library services. Further, authors who have contributed to LIS Management and Marketing Section were also included as the respondents of the survey. Out of the 50 LIS professionals and experts, 30 complete responses were received which have been analyzed and presented in this study. In addition, Microsoft Excel is also used for tabulating and calculating the various results pertaining to this study.

RESULTS

The various results retrieved from the online questionnaire are described below:

❑ Profile of Respondents

The questionnaire included the designations of the respondents as Senior Library Manager, Middle Library Manager, Junior Library Manager, LIS Teacher and LIS Researcher. The profiles of the respondents are shown in Figure 1.

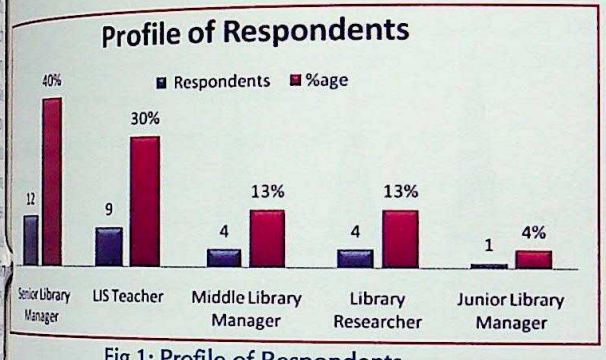

Fig.1: Profile of Respondents

As can be seen in figure 1, majority of the respondents 40% are senior library managers followed by LIS teachers 30%. In addition to the five identified designations, two profiles viz. middle library manager and LIS researchers found equally i.e. 13% each but minority profile discovered from junior library manager that is 4%.

❑ Length of Interest in Marketing

Although, the questionnaire was served to the focus group involved in marketing library services, to have better understanding of the how long the respondents were associated with marketing library services activities, the length of their interest in the subject was analyzed.

Table 1: Length of Interest in Marketing

Period	Respondents	%age
Less than one year	1	3
One to five years	3	10
More than five years	26	87

It was found from table 1 that 87% have been interested in the subject for more than five years. 10% were interested in the subject for more than one year but less than five years. Only 3% had been associated with the subject for less than one year.

❑ LIS Marketing Related Activities

To know the marketing activities in which the respondents were involved, eleven marketing activities were identified to the respondents to give their feedback. Figure 2 shows the responses obtained from LIS professionals.

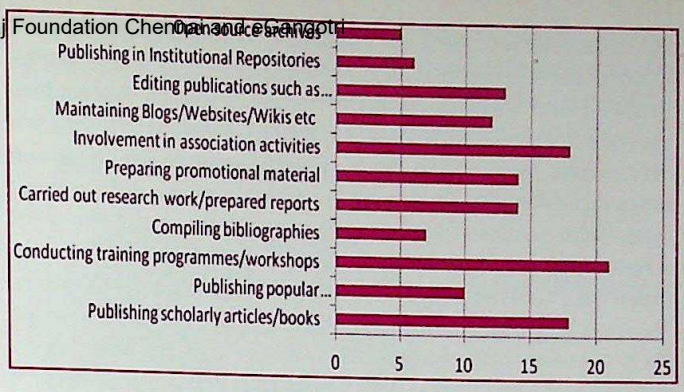

Fig. 2: LIS Marketing Related Activities

It was found that majority of (70%) respondents 21 were involved in conducting training programmes/workshops on the area of marketing library services and each 18 respondents were involved in publishing scholarly articles/books and involvement in association activities. While minority just 5 respondents engaged with open access archives. Hence, maximum LIS professionals involved in activities namely conducting training programmes/workshops is dominating relative to other activities on marketing of library services.

❑ Perceptions towards Marketing Library Services

The following statements were asked to the respondents to react on a five point scale:

- Marketing is essential in library and information service
- Effective managers require separate marketing sections.
- Enough budget is required to carry out marketing activities in libraries
- Specialized marketing persons require to manage marketing activities
- One can easily learn about marketing with using resources on the Internet
- Internet resources on marketing library services are sufficient

The responses got from each of the statement were studied and are discussed below:

Table 2: Perceptions towards Marketing Library Services

Statements	Strongly Agree	Agree	Un-decided	Dis-agree	Strongly Disagree
Marketing is essential in library and information service	79%	21%	-	-	-
Effective managers require separate marketing sections	31%	38%	23%	8%	-
Enough budget is required to carry out marketing activities in libraries	30%	59%	4%	7%	-
Specialized marketing persons require to manage marketing activities	4%	26%	33%	37%	-
One can easily learn about marketing with using resources on the Internet	11%	21%	25%	43%	-
Internet resources on marketing library services are sufficient	7%	21%	25%	36%	11%

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The statement regarding the essentiality of marketing library and information services was asked to the respondents and responses received from them revealed by table 2 that all respondents agreed with the statement that marketing is essential in library and information service with 79 % strongly agree to the statement. Majority of the respondents 69% agreed in which 38% strongly agree with separate marketing sections statement. 23% of the respondents were undecided whereas 8% disagreed with the statement. Enough budget needed for marketing activities in the libraries, It is clearly displayed in table that highest respondents 89% agreed including 30% strongly agreed and lowest respondents 4% unable to decide the said statement. 37% respondents opined that non-LIS marketing persons were not required to manage marketing activities in the libraries. 32% respondents agreed and strongly agreed that the resources available on the Internet can be used for learning marketing library information resources. 47% respondents responded disagree with the statement in which 11 % strongly disagreed towards sufficient of Internet resources on the marketing library services on Internet.

❑ Frequency of use of Search Engines to Retrieve Required Information

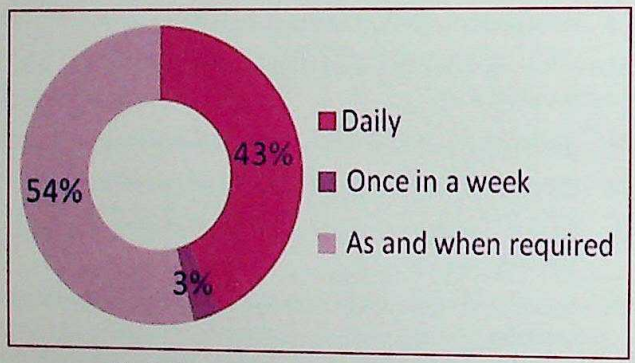

Fig. 3: Frequency of use of Search Engines

To understand how often the LIS professionals use search engines to search for information, a question was asked and responses obtained against above question represented by figure 3 that large numbers of respondents 54% used the search engines as and when required, 43% use it daily and 3% used the search engines just once a week. However, most LIS professionals used search engines as and when required.

❑ Ranking of Search Engines for Searching Information

There are a number of search engines available that one can use to search and retrieve information from the Internet. To know how LIS marketing professionals preference of these search engines, the respondents were asked to rank the five search engines. This ranking is shown through table 3.

Table 3: Ranking of Search Engines used for Searching Information

Search Engine	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5
Yahoo	0	72%	22%	0	6%
Google	100%	0	0	0	0
MSN Live	0	27%	45%	9%	19%
AskJeeves	0	9%	9%	64%	18%
AltaVista	0	7%	29%	21%	43%

It is interesting to view from table 3 that Google was ranked as first choice 100% of the all respondents, Yahoo ranked at second with the majority by 72% respondents rating it followed by MSN Live which ranked at number 3, AskJeeves ranked on number 4 and AltaVista ranked at last 5th position. Hence, Google search engine is the first choice of respondents to search information on the subject on Internet.

❑ Preferred Terms for Searching Literature on LIS Marketing

For high precision and recall of search results, it is essential to choose the best search strategy with the right combination of keywords used for searching information. For this purpose, the search terms have been identified for this study for efficient searching of information on marketing for library and information services. To know the LIS professionals preference with regard to search terms, they were asked to rank the search terms.

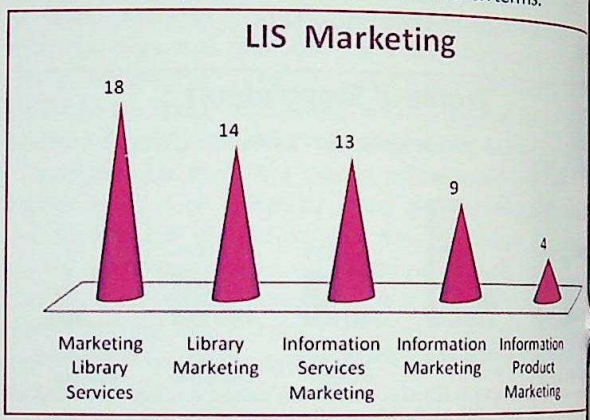

Fig. 4: Preferred Terms for Searching Literature on LIS Marketing

From the figure 4, it can be seen that majority of the respondents preferred to use the search term, 'Marketing Library Services' followed closely by the search terms 'Library Marketing' and 'Information Services Marketing'. The search term 'Information Marketing' was also used by a few participants, but the least used search term was 'Information Product Marketing'.

❑ Availability of Resources on the Internet

A question regarding opinions about the availability of the information resources was asked to target group. Figure displayed the responses in which 44% of the respondents claimed that internet resources on

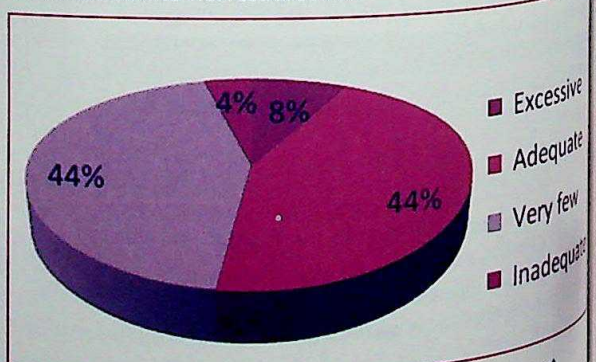

Fig. 5: Availability of Resources on the Internet

marketing of library services area were adequate whereas excessive proportion 44% respondents responded that the resources were very few. Only two respondents gave opinion that the resources

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were excessive and just one respondent found that information resources on subject on internet were inadequate.

Fulfillment of Information Needs

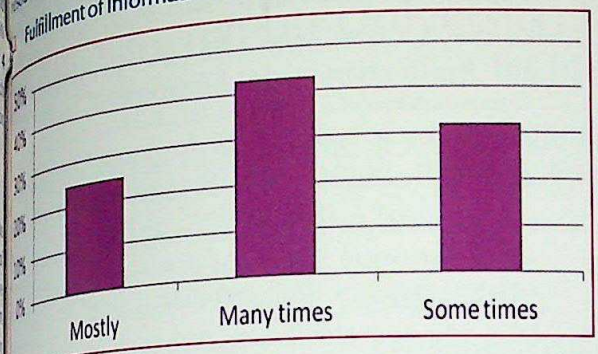

Fig.6: Fulfillment of Information Needs

Figure 6 shows that 12 respondents i.e. 43% found the information useful many times, and 32% found the information useful only sometimes. Just 25% of the users found the information useful mostly. Thus, maximum LIS professional found information useful many times.

Relevance of Information Retrieved

When the library and information science professionals were asked if they found the information available on Internet on marketing library services was relevant or not. The responses obtained from target professionals were displayed by figure 7 below:

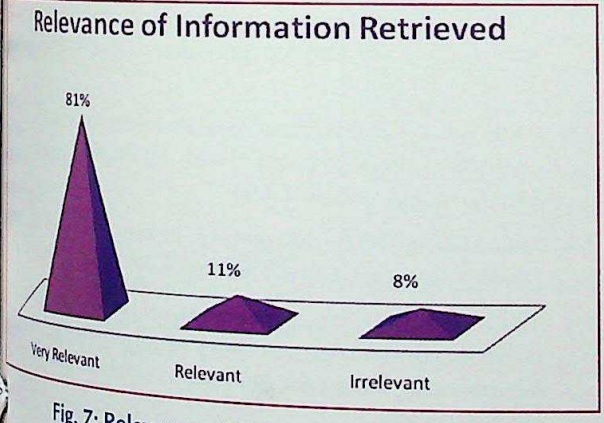

Fig. 7: Relevance of Information Retrieved

Figure 7 depicts that the 81% respondents found the relevant information available on marketing library services and 11% found information to be very relevant. Only 8% claimed that relevant information is available on internet on the subject.

Currency of Information on the Internet

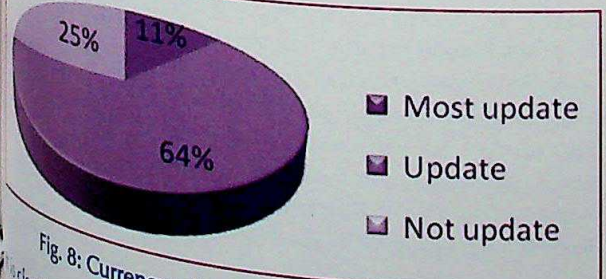

Fig. 8: Currency of Information on the Internet

It is clearly seen by figure 8 that majority 64% of the respondents found that information available on marketing of library services is update and 11% of the respondents found information to be most updated. 25% of the respondents found that the information available marketing library service on the Internet is not updated.

Reliability of Information on the Internet

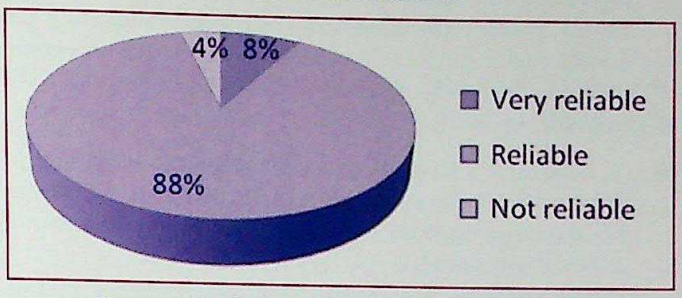

Fig. 9: Reliability of Information on the Internet

It was found from figure 9 that a large numbers of respondents 88% perceived the information available on the Internet is reliable and 8% perceived that information is very reliable while only 4% respondents viewed that information on the Internet is not reliable.

Alternate Means to Obtain Information

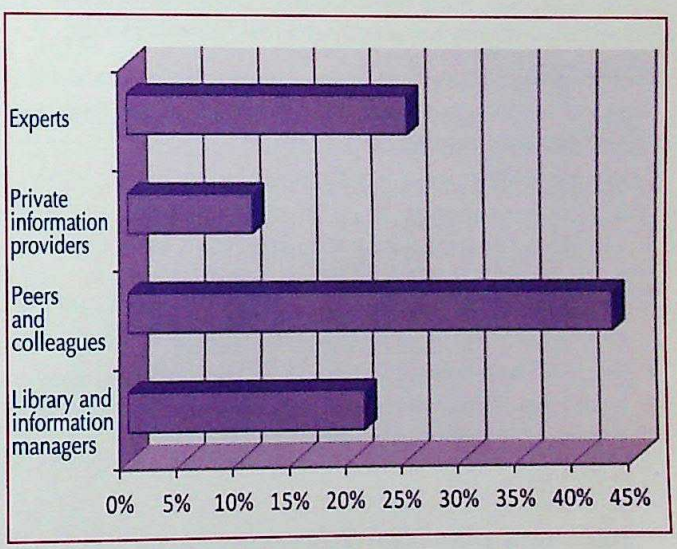

Fig.10: Alternate Means to Obtain Information

It was discovered by figure 10 that majority of respondents 44% used peer and colleagues, 26% used experts which is nearly followed by 20% from library and information managers, and 10% respondents used private information providers as alternative means for obtaining information on the marketing library services.

MAJOR FINDINGS

- The majority of the respondents are senior library managers involved in activity for conducting training programmes/ workshops on the area of marketing library services.
- Marketing library service found the most appropriate term for searching relevant resources on marketing library services.
- Google and Yahoo search engines discovered maximum relevant resources on the subject.
- Majority of respondents claimed that separate sections and enough budget required for marketing activities.

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SUGGESTIONS

- Some search engines such as Google and Yahoo have been the most preferred general search engines for many years now. Since, different search engines have different search algorithm, it is well known that all of them do not return similar search results. Therefore, it is essential to carry out search engine studies on different areas of LIS on certain period basis in order to identify the best search engines for a particular topic.
- It is necessary to produce more studies on evaluation of internet resources on marketing of library services and other LIS areas using different criteria according to internet resources categories.
- It is necessary to build one stop point/shop/platform/website to gather all kind internet resources on marketing of library services at one place.
- It is also necessary to carry out perception of subject specific people in certain intervals in order to know their real insights and opinions that certainly helpful to get strengths and weaknesses of internet resources available on a particular subject.

Future Research may be carried out on the Following Issues:

- The study on new version of evaluation criteria and other benchmarks to evaluate internet resources on the other area of library and Information Science.
- Longitudinal studies (over a period of time) may carry out to judge the availability of internet resources on a particular subject by using many search engines.
- Study focused on development of models or one stop point to access internet resources on the other subjects of LIS.
- Study of user's pattern and behavior for internet resources on marketing library services as well as other LIS subjects in particular time frame intervals.

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Citation Analysis of Doctoral Theses in Biotechnology Submitted to Kuvempu University, Karnataka: A Case Study

Koteppa Banateppanvar*, B.S.Biradar** and B.U.Kannappanavar ***

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* Research Scholar
** Professor
Dept. of PG Studies and Research in LIS
Kuvempu University
Jnana Sahyadri Shankaraghatta

*** Sr. Grade Librarian
Sahyadri Arts and Commerce College
Shimoga

Corresponding Author
Koteppa Banateppanvar
koteshlibrarian@gmail.com

ABSTRACT

The purpose of this paper is to describe the citation study as an emergent field for university libraries. There is a constant need to adapt to the ongoing changes and new demands of today's information environment, and the increasing importance of citation study certainly presents a great opportunity for librarians to broaden their horizon. The study employed descriptive research design. Data collected from 15 doctoral theses accepted by the Kuvempu University, Karnataka, India in the field of Biotechnology from 2003-2006. Data were extracted from title page and references given at the end of each chapter. The cited documents are recorded on 5"x3" slips and the same has been tabulated in Microsoft Excel, and extracted data were analysed using statistics.

Citation study is ideal for librarians to develop and provide innovative services for both universities and administrative university staff. The study reveals that journals are the most preferred sources of information used by the researchers in the field of biotechnology accounting for 79.72% of total citations although citations from books, proceedings, theses, reports and patents are also found. It is also observed small percentage of users also cited web resources. Plant cell tissue & org .cult (Netherlands) has ranked the first with 121 citations accounting for 4.16% of the total journal citations. Further, Bradford's Law of Scattering was applied. It is observed that major citation from journal literature, besides that study examined the authorship pattern more cited materials were contributed by Multi authors and Degree of collaboration is 0.85.

KeyTerms: Citation study, Authorship Pattern, Journals Ranking, Bradford's Law, Biotechnology.

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INTRODUCTION

Biotechnology is a fascinating subject in the present education field. Presently, biotechnology research is being treated as one of the world's foremost and essential research compared to all other subject areas. It deals with the application of biological knowledge and techniques pertaining to molecular, cellular and genetic processes to develop significantly improved products and services[2]. Biotechnology is a branch of science where living organisms and their products are used for the production of food, drink, medicine or for other benefits to the human race, or other animal species. It is the practice of using plants, animals and micro-organisms such as bacteria, as well as biological processes to affect outcomes such as the ripening of fruit[3].

With the ever-increasing number of journals and books in existence, libraries are challenged with deciding which journals they have to subscribe and to which books they have to purchase. They must contend with limited and sometimes decreasing funding, as well as limited physical space in which to house their collections. Inadequate funding may result in problems related to staffing, programming, facilities, and collection management[4].

Citation analysis is a technique of bibliometrics. It is an important research tool understanding the subject, which we analyze the structure and direction of the subject. It measures the utility of documents and relationship between their author and their documents. This is the direct method to analyze the library record to determine the actual sue of the documents. These types of

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information can provide useful ideas for acquisition of important material selection of document etc. This can helps libraries; it also helps the information system designers to plan their products and services[5].

OBJECTIVES

The following are the major objectives of the study:

- To determine the year wise distribution of thesis submitted in Biotechnology.
- To trace out the average number of references per thesis.
- To know the various sources of information consulted by the researchers in Biotechnology.
- To observe the nature of authorship pattern and degree of collaboration
- To know the Chronological distribution of citations.
- To study the distribution of citations by subject wise.
- To study the distribution of documents, according to their country of origin.
- To examine the core journals of Biotechnology.
- To examine the applicability of Bradford's Law of scattering to the pattern of journals used by the researchers in Biotechnology.

METHODOLOGY

The present study is concerned with the analysis of citations appended to the doctoral theses accepted in the field of Biotechnology for the award of doctoral degrees by Kuvempu University, Shimoga, Karnataka, (India) from 2003-2006. 15 Ph.D theses are available in the University Library of Kuvempu University. A total of 3646 citations, appended to these theses form the basis for the study. The information relating to each citation i.e., number of authors, bibliographic form, name of the journal, subject, country of origin and the availability of references in the library concerned. If the citations are from a journal, the information regarding the country, and the subject of the journal are obtained from 'Ulrich's International Periodicals Directory' and recorded on the reference cards of standard size of 5"x3" slips and the same have been tabulated using Microsoft Excel, and extracted the data to meet the objectives of the study.

RESULTS AND DISCUSSIONS

Analysis of data is the penultimate step in research process. It is the link between raw data and significant results leading to conclusion. This process of analysis has to be result oriented. In other words, it must aim at sitting objectives.

❑ Year wise Distribution of Submission of Theses

Table 1: Year wise Distribution of Theses

Year	Number of Theses	%age
2003	4	26.66
2004	3	20
2005	5	33.4
2006	3	20
Total	15	100

Table 1 shows the total number of theses according to year of submission. A maximum number of 5 theses were submitted the year 2005, followed by 4 in 2003, and 3 theses each in year 2004 and 2006.

❑ Average Number of Citations per Thesis

Table 2: Average Citations per Thesis

Year	Total Theses	Total Citations	Average Citations Per Thesis
2003	4	1101	275.25
2004	3	692	230.66
2005	5	900	180
2006	3	953	317.66
Total	15	3646	243.06

Table 2 present the data regarding the average number of citations per thesis. It is observed from the study that on an average 243 citations were cited per thesis by the Biotechnology research scholars. Further it is observed from the table that the highest number of citations per thesis is 317.66 were found in the year 2006.

❑ Distribution of Citations According to Bibliographic Forms

Table 3: Citations According to Bibliographic Forms

Bibliographic Form	Citation	Cumulative Citation	%age	Cumulative %age
Journals	2906	2906	79.72	79.72
Books and Monographs	585	3491	16.04	95.76
Conference Proceedings	60	3551	1.64	97.40
Thesis and dissertations	41	3592	1.12	98.52
Websites	38	3630	1.04	99.56
Reports	13	3643	0.35	99.91
Patents	3	3646	0.09	100
Total	3646		100	

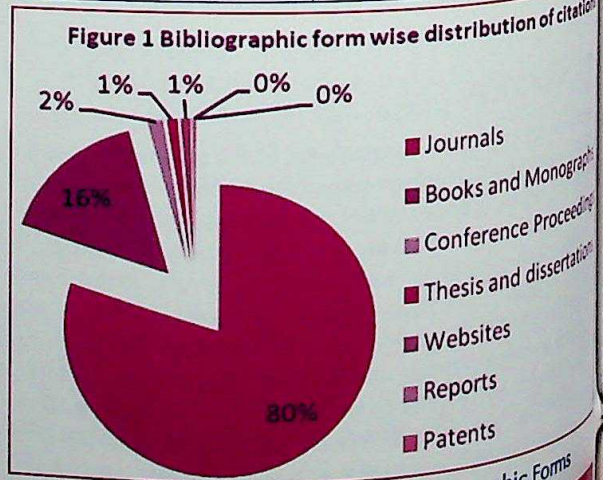

Fig.1: Citations According to Bibliographic Forms

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Table 3 and figure 1 shows the distribution of different forms of citations in the field of Biotechnology. It is observed from the table that the journal contributes the highest number of citations accounting for 79.72% of the total citations. This indicates that the journals are the most profusely cited source of information by the Biotechnology researchers. Books are the second most cited source accounting for 16.04% of the total citations. In other words journals and books together constitute 95.76% of the total number of citations cited by the research scholars.

The next preferred source of information for Biotechnology research scholars is the seminar/conference proceedings accounting to 1.64% followed by theses and dissertations 1.12% and reports 0.35%. Another new source of information for the present society is web resources 1.04% which also found place in the bibliographic forms.

❑ Authorship Pattern of Journal Citations

Table 4: Authorship Pattern of Journal Citations

No. of Authors	Total Citations	%age	Foreign Authors	%age	Indian Authors	%age
One	447	15.38	364	12.52	83	2.85
Two	820	28.22	538	18.51	282	9.70
Three	622	21.40	449	15.47	173	5.96
Four	418	14.38	292	10.04	126	4.34
Five	232	7.98	159	5.49	73	2.51
Six	158	5.44	121	4.16	37	1.27
Seven	76	2.61	65	2.23	11	0.38
Eight & above	133	4.59	109	3.75	24	0.82
Total	2906	100	2097	72.17	809	27.83

Table 4 Clearly shows that authorship pattern of journal citations indicates that out of total number of 2906 citations, 820(28.22%) are by two authors. Among the two authorship, foreign authors' contribution constitutes 18.51%, while Indian authors contributed 9.70%. Overall contribution indicates that foreign author's percentage is 72.17% while Indian author's percentage is 27.83%.

Collaborative research is the common phenomenon in the field of science and technology in general and Biotechnology in particular. According to Price[6] investigation have pointed out that there has been a consistent trend towards increased collaboration. The collaborative research is a well recognized feature of modern science, and there has been a consistent trend towards increased collaboration in all branches of science during the present century. There is an attempt made to know whether the trend towards increased collaboration in Biotechnology is there or not.

By analyzing the table 4 it is observed that majority of the cited documents were by two and more authors that means the collaborative research is prevailing in Biotechnology subject. Further the table shows that 15.38% of all the citations are in favour of single authors and remaining 84.62% of citations in favour of team research.

Degrees of collaboration among authors is calculated by the following formula given by K. Subramanyam[7].

$$C = \frac{NM}{NM+NS}$$

Where, C = Degree of collaboration

NM= No. of multi authored papers

NS= No. of single authored papers

$$\frac{2459}{2459+447} = \frac{2459}{2906}$$

In the present study the degree of collaboration C= 0.85

❑ Chronological Distribution of Journal Citations

Table 5: Chronological Distribution of Journal Citations

Period	No. of Citations	Cumulative Citations	%age	Cumulative %age
1700-1799	2	2	0.06	0.06
1800-1849	8	10	0.27	0.33
1850-1899	14	24	0.48	0.81
1900-1909	17	41	0.58	1.39
1910-1919	17	58	0.58	1.97
1920-1929	19	77	0.65	2.62
1930-1939	42	119	1.44	4.06
1940-1949	89	208	3.06	7.12
1950-1959	168	376	5.78	12.90
1960-1969	226	602	7.77	20.67
1970-1979	248	850	8.53	29.20
1980-1989	310	1160	10.66	39.86
1990-1999	1003	2163	34.55	74.41
2000-2006	743	2906	25.59	100
Total	2906		100	

Table 5 and figure 2 indicate the chronological distribution of journal citations. The maximum number of citations 1003 (34.55%) are covered during the period of 1990-1999, followed by the period 2000-2006 accounting for 743(25.59%). It clearly shows the recent information is essential for the Biotechnology research scholars.

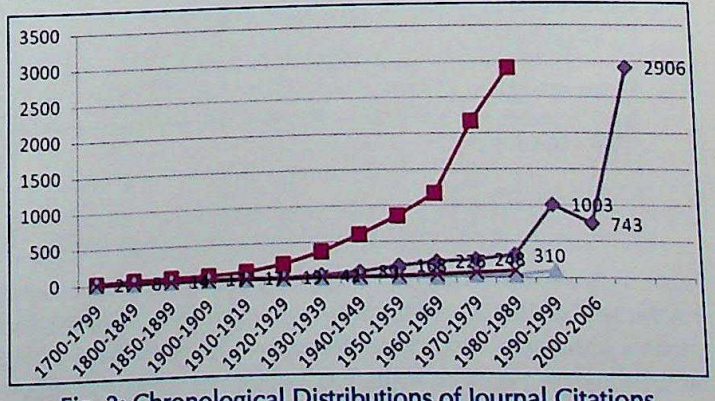

Fig. 2: Chronological Distributions of Journal Citations

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Subject wise Distribution of Citations

Table 6: Subject wise Distribution of Citations

Subject	No. of Citations	Cumulative Citations	%age	Cumulative %age
Toxicology	404	404	13.90	13.90
Medicinal Plants	252	656	8.67	22.57
Psciculture	210	866	7.22	29.79
Phytochemistry	176	1042	6.10	35.89
Plant Biotechnology	166	1208	5.78	41.67
Pharmacology	151	1359	5.19	46.86
Horticulture	132	1491	4.53	51.39
Apiculture	112	1603	3.85	55.24
Floristics Studies	108	1711	3.71	58.95
Plant Biodiversity	104	1815	3.57	62.52
Entomology	102	1917	3.50	66.02
Plant Pathology	98	2015	3.37	69.39
Micro Propagation	92	2107	3.16	72.55
Biodiversity	89	2196	3.06	75.61
Biocontrol	76	2272	2.61	78.22
Vegetational Analysis	71	2343	2.44	80.66
Plant tissue culture	69	2412	2.37	83.03
Sericulture	68	2480	2.33	85.36
Agriculture Biotechnology	57	2537	1.96	87.32
Molecular Biology	55	2592	1.89	89.21
Genetic Engineering	53	2645	1.82	91.03
Insect Morphology	40	2685	1.37	92.40
Cell Biology	32	2717	1.10	93.50
Fermentation Technology	31	2748	1.06	94.56
Medicinal Genetics	28	2776	0.96	95.56
Mycology	26	2802	0.89	96.45
Physiochemistry	24	2826	0.83	97.28
Cytogenetics	22	2848	0.75	98.03
Hepatology	22	2870	0.75	98.78
Microbiology	18	2888	0.61	99.39
Food Processing	18	2906	0.61	100

Table 6 clearly shows subject wise distribution of journal citations. Toxicology 13.90%, Medicinal Plants 8.67%, Psciculture 7.22% Phytochemistry 6.10%, Plant Biotechnology 5.78%, Pharmacology 5.19%, Horticulture 4.53% contributes the 51.39%, of the total citation remaining subjects together contributes 48.61% of the total citations. This clearly indicates that the research trend in biotechnology is towards Toxicology, Medicinal Plants, Psciculture, Phytochemistry and Plant Biotechnology.

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Country-wise Distribution of Citations

Table 7: Country-wise Distribution of Citations

Country	Citations								
	Journals	Books	Proceedings	Theses	Websites	Reports	Patents	Total	%age
USA	1010	205	10	02	00	01	01	1229	33.71
India	642	189	36	33	00	09	00	909	24.93
UK	361	128	03	03	00	01	01	497	13.63
Netherlands	206	05	01	00	00	00	00	212	5.81
Germany	172	18	01	00	00	00	00	191	5.24
Japan	104	07	01	01	00	01	00	114	3.12
Ireland	82	04	00	00	00	00	00	86	2.36
Italy	81	03	01	00	00	00	00	85	2.33
China	34	02	01	00	00	00	00	37	1.01
Canada	26	00	00	00	00	00	00	26	0.74
Switzerland	21	01	01	00	00	00	00	23	0.63
Denmark	18	01	00	00	00	00	00	19	0.52
France	14	04	01	00	00	01	00	20	0.55
Brazil	12	01	01	01	00	00	00	15	0.44
Pakistan	12	01	00	00	00	00	00	13	0.35
Korea	12	01	01	00	00	00	00	14	0.38
Belgium	08	00	00	01	00	00	00	09	0.24
S. Africa	06	01	00	00	00	00	00	07	0.19
Russia	05	00	00	00	00	00	01	06	0.16
Taiwan	05	00	00	00	00	00	00	05	0.13
Other Countries	75	14	02	00	38	00	00	129	3.53
Total	2906	585	60	41	38	13	03	3646	100

Table 7 presents the country wise analysis of most cited documents it indicate that out of 3646 cited documents USA occupies the top position with accounting 1229(33.71%) citations. The second highest utilized sources are originated from India 909(24.93%), followed by UK which accounts 497(13.63%). Small percent of documents are also cited by the researcher, which are published from Netherlands 212(5.81%) Germany 191(5.24%), Japan, Ireland, Italy, China and Canada placed in six, seventh, eight, nine, and ten position respectively. The analysis reveals that most of the scholars are depending on the literature published from USA and India only.

Rank List of Cited Journals

The ranked list provides unbiased data regarding the potentiality of journals that are useful to specialist readers in selecting the ones more relevant to their field, and to keep themselves abreast with new developments in their specialization. This list can be used for effective selection and acquisition in a library. The periodicals collection can also be divided due to space limitation or for any other taken on the basis of ranked list of periodicals. The ranked list prepared as a result of the analysis of citations should reflect the priority given by the readers to the journals. Such ranked lists are very often used as guidelines in the acquisition of periodicals in the library. Table 8 represents a rank list of most frequently cited journals in biotechnology.

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Table 3: Rank List of Journals in Biotechnology

S. No.	Rank No.	Journals Title	No. Citations	Cumulative Citations	%age	Cumulative Percentage	Country
1.	1	Plant cell tissue & org .cult	121	121	4.16	4.16	Netherlands
2.	2	Plant physiology	113	234	3.89	8.05	USA
3.	3	Phytopathology	96	330	3.30	11.35	USA
4.	4	Current science	91	421	3.13	14.48	India
5.	5	Indian journal of pharmaceutical science	87	508	2.99	17.47	India
6.	6	Indian journal of experimental Biology	67	575	2.30	19.77	India
7.	7	Journal of ethnopharmacol.	66	641	2.27	22.04	Ireland
8.	8	Fitoterapia	62	703	2.13	24.17	Italy
9.	9	Plant cell reports	58	761	2	26.17	Germany
10.	10	Indian drugs	56	817	1.92	28.09	India
11.	11	Genome research	50	867	1.72	29.81	USA
12.	12	Phyther. Research	44	911	1.51	31.32	UK
13.	13	Nature	37	948	1.27	32.59	UK
14.	13	Theoretical and applied genetics	37	985	1.27	33.86	Germany
15.	13	Plant science	37	1022	1.27	35.13	USA
16.	14	Phytochem	36	1058	1.27	36.40	UK
17.	14	Proc. Natl acad scie USA	36	1094	1.23	37.63	USA
18.	15	Science	34	1128	1.17	38.80	USA
19.	16	Journal boil. Chem..	33	1161	1.13	39.93	USA
20.	17	Plant medica	29	1190	1	40.93	Germany
21.	17	Indian Bee Journal	29	1219	1	41.93	India
22.	17	Indian phytopathol	29	1248	1	42.93	India
23.	18	Physiology mol. Plant pathology	27	1275	0.93	43.86	UK
24.	19	Journal agric. Food chem.	24	1299	0.82	4.68	USA
25.	20	Plant molecular biology reporter	18	1317	0.62	45.30	Netherlands
26.	20	Appl. Environ. Microbiol.	18	1335	0.62	45.92	USA
27.	20	Biotechnology	18	1353	0.62	46.54	UK
28.	20	In vitro cellular & developmental biology plant	18	1371	0.62	47.16	USA
29.	21	Indian Journal sericulture	16	1387	0.55	47.71	India
30.	22	Pharmacol. Boil	15	1402	0.51	48.22	Netherlands
31.	23	Journal natural production	14	1416	0.48	48.70	USA
32.	23	Journal of invertable pathology	14	1430	0.48	49.18	USA
33.	23	Plant disease	14	1444	0.48	49.66	USA
34.	24	Crop science	13	1457	0.44	50.10	USA
35.	25	Mushroom science	12	1469	0.41	50.51	UK
36.	25	Mycological research	12	1481	0.41	50.92	USA
37.	25	Exp. Cells research	12	1493	0.41	51.33	Netherlands
38.	25	FEBS letters	12	1505	0.41	51.74	

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	25	Indian journal of mycology & plant pathology	12	1517	0.41	52.15	India
	25	Journal pharmacy and pharmacol	12	1529	0.41	52.56	UK
	25	Journal Indian botany society	12	1541	0.41	52.97	India
	25	Nature biotechnol	12	1553	0.41	53.38	USA
	25	Symposium for society of experimental biology	12	1565	0.41	53.79	USA
	26	Aquaculture	11	1576	0.38	54.17	UK
	26	American naturalist	11	1587	0.38	54.55	USA
	26	Antimicrob. Agents chemother.	11	1598	0.38	54.93	USA
	27	Environmental entomology	10	1608	0.34	55.27	USA
	27	Lancet	10	1618	0.34	55.61	USA
	27	Annual review of entomology	10	1628	0.34	55.95	USA
	27	American journal of botany	10	1638	0.34	56.29	USA
	27	Annuals of botany	10	1648	0.34	56.63	UK
	27	Bull. Bot. surv. India	10	1658	0.34	56.97	India
	27	Indian journal biotechnology	10	1668	0.34	57.31	India
	27	Plant journal	10	1678	0.34	57.65	UK
	27	Chemical and pharmaceutical Bulletin	10	1688	0.34	57.99	Japan
	27	Indian journal of agricultural Sciences	10	1698	0.34	58.33	India
	27	Indian journal genet plant breed	10	1708	0.34	58.67	India
	27	Journal pharma. Scince	10	1718	0.34	59.01	USA
	27	Japan Journal breed	10	1728	0.34	59.35	Japan
	27	Nature genetics	10	1738	0.34	59.69	USA
	28	Arch. Intern. Med.	9	1747	0.31	60	USA
	28	Biochem. Pharmacol	9	1756	0.31	60.31	USA
	28	Clinical microbiology reviews	9	1765	0.31	60.62	USA
	28	Journal plant biotechnology	9	1774	0.31	60.93	India
	28	Journal of nutrition	9	1783	0.31	61.24	USA
	28	Journal of food science & Technology	9	1792	0.31	61.55	India
	28	Mycologia	9	1801	0.31	61.86	USA
	28	Phytomorphology	9	1810	0.31	62.17	India
	28	Plant pathology	9	1819	0.31	62.48	UK
	28	Ann.rev plant physiology	9	1828	0.31	62.79	USA
	28	Indian journal nematology	9	1837	0.31	63.10	India
	29	Canadian J.of Plant science	9	1846	0.31	63.41	Canada
	29	Methods in enzymology	8	1854	0.27	63.68	USA
	29	Food chemistry	8	1862	0.27	63.95	UK
	29	Journal of bacteriology	8	1870	0.27	64.22	USA
	29	Bull. Seric. Expt. Sta. Japan	8	1878	0.27	64.49	Japan
	29	Journal plant physiology	8	1886	0.27	64.76	Germany
	29	Indian journal of natural products	8	1894	0.27	65.03	India
	29	Pflanzenphysiol	8	1902	0.27	65.30	Germany

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80.	30	Annals biochem	7	1909	0.24	65.54	USA
81.	30	Biochemistry journal	7	1916	0.24	65.78	Japan
82.	30	Annu.rev. phytopathol	7	1923	0.24		USA
83.	30	Biotechnology letters	7	1930	0.24	66.26	Netherlands
84.	30	Bull. Japan soc. Sci. Fish	7	1937	0.24	66.50	Japan
85.	30	Canadian journal of botany	7	1944	0.24	66.74	Canada
86.	30	Indian forester	7	1951	0.24	66.98	India
87.	30	Indian silk	7	1958	0.24	67.22	India
88.	30	Indian journal of mushrooms	7	1965	0.24	67.46	India
89.	30	Indian coffee	7	1972	0.24	67.70	India
90.	31	American j. pathology	6	1978	0.20	67.90	USA
91.	31	American j clin pathol.	6	1984	0.20	68.10	USA
92.	31	Annu. Rev. ecol. Syst.	6	1990	0.20	68.30	USA
93.	31	Ann. Rev. genet.	6	1996	0.20	68.50	USA
94.	31	Acta horticulture	6	2002	0.20	68.70	Belgium
95.	31	Annals of applied biology	6	2008	0.20	68.90	UK
96.	31	Hort science	6	2014	0.20	69.10	USA
97.	31	Seed science and technology	6	2020	0.20	69.30	Switzerland
98.	31	Journal phytopath	6	2026	0.20	69.50	Germany
99.	31	Molecular & general genetics	6	2032	0.20	69.70	Germany
100.	31	Biological & pharmaceutical bulletin	6	2038	0.20	69.90	Japan
101.	31	Ecology	6	2044	0.20	70.10	UK
102.	31	Journal of molecular biology	6	2050	0.20	70.30	UK
103.	31	Journal natural remedies	6	2056	0.20	70.50	USA
104.	31	Journal Bombay natural history Society	6	2062	0.20	70.70	India
105.	31	Journal tropical med. Plants	6	2068	0.20	70.90	Japan
106.	31	EMBOJ	6	2074	0.20	71.10	UK
107.	31	Indian journal med. Research	6	2080	0.20	71.30	India
108.	31	Journal of experimental botany	6	2086	0.20	71.50	UK
109.	31	Journal of general virology	6	2092	0.20	71.70	UK
110.	31	Mutation research	6	2098	0.20	71.90	Netherlands
111.	31	Transgenic research	6	2104	0.20	72.10	Netherlands
112.	31	Virology	6	2110	0.20	72.30	USA
113.	31	European journal of plant pathology	6	2116	0.20	72.50	Netherlands
114.	31	Human molecular genet	6	2122	0.20	72.70	UK
115.	31	Journal of American soc. of horticultural science	6	2128	0.20	72.90	USA
116.	31	American j med genet.	6	2134	0.20	73.10	USA
117.	31	Madras agric. Journal	6	2140	0.20	73.30	India
118.	31	Process Biochem	6	2146	0.20	73.50	UK
119.	31	Toxicology	6	2152	0.20	73.70	Ireland
120.	32	African journal biotechnol	5	2157	0.17	73.87	Africa
121.	32	American j enology viticulture	5	2162	0.17	74.04	USA

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122.	32	Biochem. Pharmacol	5	2167	0.17	74.21	USA
123.	32	Biotechnology bioeng.	5	2172	0.17	74.38	USA
124.	32	Cell	5	2177	0.17	74.55	USA
125.	32	Journal of economic entomology	5	2182	0.17	74.72	USA
126.	32	Journal tropical medicinal plants	5	2187	0.17	74.89	Japan
127.	32	Journal of general microbiology	5	2192	0.17	75.06	UK
128.	32	Evolution	5	2197	0.17	75.23	USA
129.	32	Molecular plant microbe interactions	5	2202	0.17	75.40	USA
130.	32	Journal plant biochemistry and Biotechnology	5	2207	0.17	75.57	India
131.	32	Plant cell biotech & mol. Boil.	5	2212	0.17	75.74	Netherlands
132.	32	Kew bulletin	5	2217	0.17	75.91	UK
133.	32	Nat. prod science	5	2222	0.17	76.08	Korea
134.	32	Proc. Indian acad sci	5	2227	0.17	76.25	India
135.	32	Acta pharmacol toxicol.	5	2232	0.17	76.42	Denmark
136.	32	Mysore j. agric. Science	5	2237	0.17	76.59	India
137.	32	Indian food packer	5	2242	0.17	76.76	India
138.	32	Journal horiticultural science & biotechnology	5	2247	0.17	76.93	UK
139.	32	Journal Hort-science	5	2252	0.17	77.10	UK
140.	32	Journal of apicultural research	5	2257	0.17	77.27	India
141.	32	Oecologia	5	2262	0.17	77.44	Germany
142.	32	Taiwania	5	2267	0.17	77.61	Taiwan
143.	32	Bioscience biotechnology biochemistry	5	2272	0.17	77.78	Japan
144.	33	16 Journals with 4 Citations each	64	2336	2.29	80.07	
145.	34	35 Journals with 3 Citations each	105	2441	3.69	83.76	
146.	35	85 Journals with 2 Citations each	170	2611	5.98	89.74	
147.	36	295 Journals with1 Citation each	295	2906	10.26	100	
Total		574	2906		100		

From the above table it is shown that the journal with the highest number of citations occupies the highest rank and thus obviously the most important journal in the field of Biotechnology while the least important titles are placed at the bottom of the table.

There are 574 journals arranged in order of their ranks. The journal entitled Plant Cell Tissue & Org. Cult., published from Netherlands occupies the first rank as the most preferred journal having been cited 121 times. Plant Physiology published from USA is scores the second highest with 113 citations, it is followed by third and fourth rank again goes to Phytopathology 96 (USA) citations and Current Science 91(India) citations and occupies the third and fourth. Indian Journal of Pharmaceutical Science (India) with 67 citations, Indian Journal of Experimental Biology (India) with 67 citations, Journal of Ethnopharmacology (Irealand) with citations, Fitotherapia (Italy) with 62, Plant Cell Reports (Germany) with 58 citations, Indian Drugs (India) with 56 citations, the first ten journals in the ranking list together accounts for 28.09% of the total citations. The table also shows that the first 85 journals out of 574 total ranked journal covers 69.90 of citations, while the remaining 474 journals together account for 30.10% of citations.

❑ Production of Journals in Biotechnology

Table 9: Production of Journals in Biotechnology

%age of Citations	No. of Citations	No. of Journals Covered	%age of Journals	Average production of Journals
0-25	703	8	1.39	87.87
26-50	754	26	4.53	29
51-75	735	93	16.21	7.90
76-100	714	447	77.87	1.59
Total	**2906**	**574**	**100**	**5.06**

It is observed from table 9 that the first groups of citations are to the first 8 journals of the rank list, thus signifying their high rate of productivity. The average productivity of each journal in the first

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group/category was 87.87 articles, where it has considerably gone down to 1.59 articles in the fourth category. This marked difference easily confirms the decreasing productivity of individual journals in the rank list.

- Distribution of Cited Journals by Decreasing Frequencies of Citations

Table 10: Distribution of Cited Journals by Decreasing Frequencies of Citations

No. of Journals	Cumulative no. of Journals	Log of Cumulative Journals	No. of Citations	Total Citations	Cumulative Citations	% of Cumulative Citations	% of Cumulative Journals
1	1	0	121	121	121	4.16	0.17
1	2	0.30	113	113	234	8.05	0.35
1	3	0.47	96	96	330	11.35	0.52
1	4	0.60	91	91	421	14.48	0.69
1	5	0.69	87	87	508	17.48	0.87
1	6	0.77	67	67	575	19.78	1.04
1	7	0.84	66	66	641	22.06	1.21
1	8	0.90	62	62	703	24.19	1.39
1	9	0.95	58	58	761	26.19	1.56
1	10	1	56	56	817	28.11	1.74
1	11	1.04	50	50	867	29.83	1.91
1	12	1.07	44	44	911	31.34	2.09
3	15	1.17	37	111	1022	35.17	2.61
2	17	1.23	36	72	1094	37.64	2.96
1	18	1.25	34	34	1128	38.81	3.13
1	19	1.27	33	33	1161	39.95	3.31
3	22	1.34	29	87	1248	42.94	3.83
1	23	1.36	27	27	1275	43.87	4
1	24	1.38	24	24	1299	44.70	4.18
4	28	1.44	18	72	1371	47.18	4.87
1	29	1.46	16	16	1387	47.73	5.05
1	30	1.47	15	15	1402	48.24	5.22
3	33	1.51	14	42	1444	49.69	5.75
1	34	1.53	13	13	1457	50.14	5.92
9	43	1.63	12	108	1565	53.85	7.49
3	46	1.66	11	33	1598	54.99	8.01
14	60	1.77	10	140	1738	59.80	10.45
12	72	1.85	9	108	1846	63.52	12.54
7	79	1.89	8	56	1902	65.45	13.76
10	89	1.94	7	70	1972	67.85	15.50
30	119	2.07	6	180	2152	74.05	20.73
24	143	2.15	5	120	2272	78.18	24.91
16	159	2.20	4	64	2336	80.38	27.70
35	194	2.28	3	105	2441	83.99	33.80
85	279	2.44	2	170	2611	89.85	48.60
295	574	2.75	1	295	2906	100	100

The graphical and verbal interpretation of the Bradford's law of scattering has been applied to the literature of biotechnology. Table 10 represents journals arranged in decreasing frequency of citations. To testify the applicability of Bradford's Law of scattering, a graph is plotted by taking the cumulative number of citations on "y" axis and log of cumulative number of journals on "x" axis. It is observed that the resulting bibliography starts rising in an exponential nature and then follows the linear curve indicating the observance of Bradford's Law of scattering[8].

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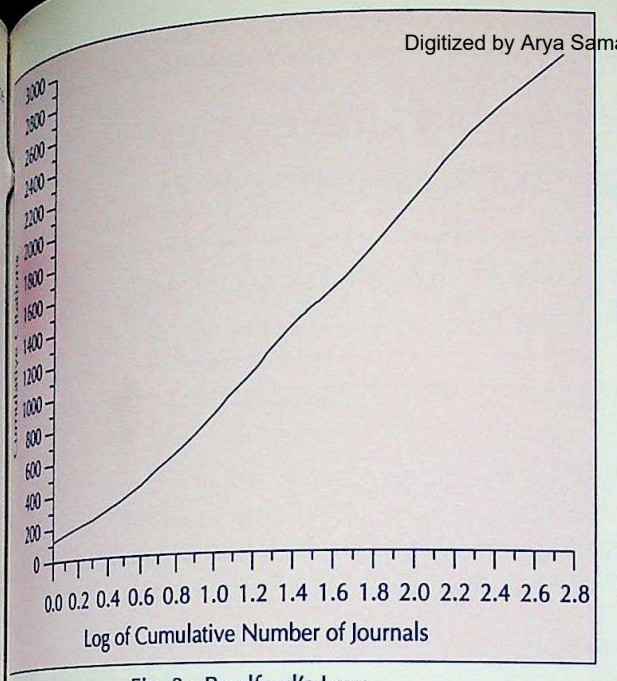

Fig. 3 : Bradford's Law

FINDINGS & CONCLUSION

A citation study is an unobtrusive method of gathering data to assist in collection development. The citation analysis of doctoral theses conducted clearly identifies the information materials consulted by research scholars of the department of Biotechnology, Kuvempu University. The analysis of the doctoral theses in biotechnology shows that researchers mainly depend on journal sources for their use. Citation pattern of source documents reveals that journal citations have been quoted more in number 73.72%, which shows not only their importance in communicating scholarly literature but also dependency of researchers on journals for their research work. Books and conference proceedings accounting 16.04% and 1.64% respectively shows their relative importance in research work. This study confirms that the journal use pattern of biotechnology researchers fits well with the Bradford's Law of scattering.

The Journal of Plant Cell, Tissue & Org .Cult. Published from Netherlands is the most cited journals 4.16%, representing its research potentiality in Kuvempu University biotechnology researcher's citations. Authorship pattern for journal citations shows that most of the citations are contributed by two authors i.e. out of 2906 citations 2459 84.62%. Foreign author's contribution is observed to be dominant in the entire authorship pattern. The degree of collaboration is found to be 0.85. The geographical distributions shows that the USA literature is mostly used for the research by researchers i.e. 33.71%. This study confirms that the journal use pattern of biotechnology researchers of this University fits well with the Bradford's Law of scattering. These findings absolutely assist librarians facing in limited budgets when making selection and de-selection decisions.

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Use of web 2.0 in Saudi Arabia Universities

Parvez Ahmad*, Akhtar Hussain** and Mohammad Aqil***

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*Web Librarian,
Portal & E-Services Deptt.
King Saud University
Riyadh-Saudi Arabia

** Web Librarian
ICEAT Group
Kingdom of Saudi Arabia- Riyadh

*** Reference Librarian
University of Dammam, Dammam

Corresponding Author
Parvez Ahmad
pahmad.c@ksu.edu.sa

ABSTRACT

The purpose of the study is to investigate the use and awareness of Web 2.0 tools such as Facebook, Twitter, YouTube, RSS feed, Flickr, LinkedIn, Tumblr and Google+ within Saudi universities. The study reveals that the Kingdom's private universities have more consistency, with seven of the eight having Facebook profiles and all Facebook profiles having standard user names. 22 of 24 Saudi Government Universities have Facebook profiles and 12 use standard user names. Facebook and Twitter are the two most familiar Web 2.0 tools. The present study only focuses on usage of Web 2.0 tools by Saudi's Private and Public Saudi Universities. The study only considers those Web 2.0 tools which are linked on websites of universities. This is the first kind of study which revealed use and awareness of Web 2.0 tools such as Facebook, Twitter, YouTube, RSS feed, Flickr, LinkedIn, Tumblr and Google+ within Saudi Universities.

Key Terms: Web 2.0, Facebook, Twitter,SGU, SPU.

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INTRODUCTION

The Kingdom of Saudi Arabia (KSA) is the Middle East's largest Arab country. The Kingdom's revenues derived through the petroleum industry, but leaders' are working to incorporate the country's dependence on petroleum with economy-based knowledge. Saudi Arabia adopted this philosophy in 1957 with the establishment of its first university, Riyadh University, eventually renamed King Saud University in honor of the Kingdom's late King Abdul Aziz Saud who ruled from 1932 through 1953. On a daily basis, the Kingdom has added a diamond to its crown in terms of research activities and collaboration with world-renowned universities[1]. As of 2012, Saudi Arabia had 24 Government-Aided Universities, including eight Private Institution[2].

Presently, government and private entities are using the Web 2.0 application for sharing information and establishing a more visible presence on the Internet. Saudi Arabia is no exception. The use of Web 2.0 tools is relatively new to both Saudi's public and private universities. In a Web 2.0 environment, students can become "producers," not only accessing and reading online information but creating and publishing and sharing content, reading and responding to their peers' writing and collaborating in the production of multi-authored texts[3].

The term "Web 2.0" was coined in 1999 by Darcy DiNucci, with the tool's popularity surging in 2004 when O'Reilly Media and Media Live organized the first Web 2.0 conference. In their opening remarks, John Battelle and Tim O'Reilly outlined their definition of "the Web as Platform" as a concept in which software applications are integrated into the web, as opposed to being placed on the desktop[4]. Abrams[5] believes that Web 2.0 is providing a "much higher level" of interactivity and in-depth user experiences, which are enhanced by the recent advances in web software, with insight into the transformational aspects of the Internet. He further stated that Web 2.0 is probably the most important concepts of our age, one that users find to be "transformational on a global scale".

Bhatt[6] and his colleagues explain that Web 2.0 applications allow for social collaboration when scientific collaboration coalesces with social networking. By using social networking tools, scientists are able to "exchange their ideas and provide constructive feedback to other researchers".

According to Kes-Erkul[7], Web 2.0 tools such as social media have the capacity to change the relationship between the Internet and its users, and can change power structures and increase the opportunity for users to engage in greater community participation. Freeman[8] claim that these technologies can be leveraged to transform the way governments provide online

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information and services, as well as interact with constituents and stakeholders. Romsdahl[9] argues that more participation of government policy-making via the Internet could help revitalize dialogue between citizens and governments and promote greater participation by disenfranchised citizens and groups as they use these technologies to educate others about political issues in their communities. According to, Danis[10] local governments can use social media sites to procure and position resources and local knowledge, monitor and resolve problems and engage their constituents in an atmosphere of cooperation. Cole[11] indicates that social media can be powerful tools governments can deploy to help rejuvenate civic engagement.

Brook[12] as cited by Kuzma[13] listed four ways that Web 2.0 social networks can have an impact on users: 1) inquiry, 2) literacies, 3) collaboration and 4) publication. "Inquiry" methods allow users to conduct new ways to research. By surfing social sites, people can research specific information on a variety of topics. The "literacies" impact implies that through experience with the written word users can improve their communication skills, therefore, can become more productive members of society and their employers. "Collaboration" helps individuals to engage in activities as online governmental debate or participation in community forums. "Publication" allows users to easily create and publish material for public dissemination. Governments find that it is relatively easy to create videos or other media material and to post these informational works on social sites.

REVIEW OF LITERATURE

The authors reviewed published studies in the past that provided the foundation for this research paper.

Adkhande[14] conducted a study examining the purpose of Library and Information Science (LIS) professionals' use of Facebook, one of the most popular social networking sites, and to understand its impact in education and social interaction. In addition, they explored Facebook's capacity to serve as an effective tool for imparting information or knowledge, and how it can be helpful in generating awareness among LIS Professionals of MLOSC, a group that considered Facebook's most important aspect to be its emphasis on online collaboration and sharing because of its social networking, user centric characteristics. They collected data through a questionnaire randomly circulated among the LIS professionals of the MLOSC Group. The analysis revealed LIS professionals derive major benefits from special network service, Facebook.

The study of Lwoga[15] was an attempt to assess the extent to which learning and Web 2.0 technologies are utilized to support learning and teaching in Africa's higher learning institutions, with specific focus on Tanzania's public universities. Content analysis and semi-structured interview methods were used for data collection. The study revealed that the implementation of e-learning and Web 2.0 technologies in Tanzania's public universities are still in their early stages. However, there was much enthusiasm amongst respondents over the development and potential of e-learning and Web 2.0 tools in their universities. Tanzanian universities face numerous challenges in their adoption and use of Web 2.0. The challenges include 1 a poor technological infrastructure, 2 an unawareness and reluctant attitude toward e-learning, 3 a lack of local expertise in curriculum development for e-learning, and 4 a lack of ICT technical support to support e-learning initiatives.

Thirugillan[16] attempted to explore the use and effectiveness of weblog services in higher education. In this study, students assessing the utilization of weblogs within their environment basically were split into two groups. One group found that the use of weblogs failed to inspire the interest they expected. Members of the second group were uncertain as to whether weblogs have the potential to improve their learning experiences, but they were relatively satisfied with the weblog's use as a tool in higher education.

Chaurasia[17] conducted a study called "comparative study in the adoption of Web 2.0 technologies between Western and Arab universities." The study's results revealed that the status of Web 2.0 usage in education is inadequate in the Arab world, as compared to Western universities. The comparative study in this paper demonstrated that the adoption of Web2.0 technologies in the Arab world's education was still in its early stages. Besides, Western universities are well diffused in their adoption of Web 2.0 technologies in education systems for the purpose of improving the learning process and effective integration of new technologies. The diffusion of Internet adoption in the Arab world suggests that Web 2.0 has the potential to proliferate in a largely young population that is increasingly proficient with technology and computer-mediated communication.

The Sriram & Kataria[18] study was to provide insight into the implementation of the innovative Web 2.0 applications at Jaypee University of Information Technology (JUIT). The study's focus was to explore the expectations of the users and their awareness and usage of such applications. A survey method was used to understand the basic awareness and expectations of library users and the usability of resources. The consequences of the Learning Resource Center (LRC) have made a number of provisions to adopt some Web 2.0 applications in its library services to create information literacy. The users of the JUIT library still lack awareness about various Web 2.0 applications necessary for teaching and learning.

The purpose of the study conducted by, Han[19] was to explore the status and construction pattern of Web 2.0 technologies hired in leading Chinese university libraries, their functionalities and features. An online survey and content analysis method was used for data collections. The primary finding of the study was that more than two-thirds of the 38 top Chinese University Libraries to apply one or more kinds of Web 2.0 tools through the elementary functions of their websites. Among the six types of tools, Catalog 2.0 and RSS were the most common, while IM, Blog, SNS and Wiki are less frequent.

In a Grosseck[20] article, the major objectives of the study were (i) to introduce theoretical aspects of using Web 2.0 technologies in higher education, (ii) to present models of integrating Web 2.0 technologies in teaching, learning and assessment, (iii) to identify the potential benefits of these technologies as well as to highlight some of the problematic issues /barriers encountered, surrounding the pedagogical use of Web 2.0 in higher education,(iv) to propose an agenda for future research, and (v) to develop pedagogy 2.0 scenarios for HE sector. The study's main revelation was that the latest generation of Web 2.0 technologies (blogs, wikis, RSS etc.) are quickly becoming ubiquitous, offering many unique and powerful information, sharing and collaboration features. The author's hope that all factors from the educational field (teachers, tutors, trainers, administrators, or those responsible for policies) will find the Web 2.0 technologies efficient and promising both for the educational process and for self-development.

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OBJECTIVES

The study specifically focused on the following objectives:

- To identify the Web 2.0 tools adopted by Saudi universities.
- To know the most popular Web 2.0 tools among Saudi universities.
- To reveal how many Saudi universities are using Web 2.0 tools.
- To discover which Saudi universities are using maximum number of Web 2.0 tools in KSA.
- To examine the use of Web 2.0 tools in Saudi universities.
- To conduct a usage analysis of Web 2.0 tools by Saudi universities.
- To reveal which Saudi universities have the most followers and tweets on Twitter.
- To identify which Saudi universities have the most number of 'likes' on Facebook.
- To know how many Saudi universities have a standard user name on Facebook.
- To discover whether university websites have given a direct link of Web 2.0 tools and Web 2.0 tools have a link on the university's websites.
- To suggest measures for maneuver and improvement of existing Web 2.0 tools in the Kingdom's higher educational institutions.

LIMITATIONS

The present study only focuses on usage of Web 2.0 tools by Saudi's Private Universities (SPU) and Saudi Government Universities (SGU). The study only considers those Web 2.0 tools which are linked to websites of universities. The authors only go for analysis of Facebook and Twitter because these both tools are significantly more popular among all tools of Web 2.0 in the Kingdom of Saudi Arabia.

METHODOLOGY

Web 2.0 has already entered the university walls in a bottom-up process. Teachers, researchers and students, in most cases without any institutional stimulus, started some years ago to use social software tools[23].

This is the interpretive approach based on qualitative as well as quantitative data analysis. This study consisted of four phases:

- Browsed all universities' websites and linked Web 2.0 tools profile on them on 2nd June, 2013.
- Count occurrences
- Analyze the results
- Discussion & Suggestion

ANALYSIS AND INTERPRETATIONS

The data collected from all linked Web 2.0 profiles on university websites. For further analysis, the authors visited Facebook and Twitter profiles of universities, organized data in excel program in tabulated form, and gathered findings.

❑ Web 2.0 Tools Adopted by all Saudi Universities (SU)

Table 1: Web 2.0 Tools Adopted by SU

Web 2.0 Applications	SGU	SPU
Twitter	22	8
Facebook	22	8
You-Tube	20	5
RSS	15	0
Flicker	5	0
Linked In	4	4
Google+	2	1
Blogs/News portal	1	1
Tumblr	1	0
Scribd	1	0
Vimeo	0	1

The study was conducted to understand the awareness regarding Web 2.0 tools such as Twitter, Facebook, YouTube, RSS feed, Flickr, LinkedIn, Tumblr and Google+ in Saudi universities. Results indicate that Twitter and Facebook (web 2.0 tools) are most popular among them as indicated in Table 1.

❑ Web 2.0 Tools used by all Saudi Government Universities (SGU)

Table 2: Web 2.0 Tools used by All Saudi Government Universities (SGU)

Government Universities	Blogs	Face-Book	Twitter	You-Tube	RSS	Flicker	Linked in	Google+	Tumblr	Scribd	Total
King Faisal University		Y	Y	Y	Y	Y	Y	Y			7
Almajmaah University		Y	Y		Y	Y			Y		5
Islamic University in Madinah		Y	Y	Y	Y	Y					5
Al-Imam Mohammad Ibn SaudIslamic University		Y	Y	Y	Y	Y					5
University of Tabuk		Y	Y	Y	Y		Y			Y	5
Shagra University		Y	Y	Y	Y						5
Taibah University		Y	Y	Y	Y	Y					5

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King Saud University	Y	Y	Y	Y							4
King Abdulaziz University		Y	Y	Y				Y			4
Najran University		Y	Y	Y	Y						4
University of Dammam		Y	Y	Y	Y						4
King Fahd University of Petroleum and Minerals		Y	Y	Y			Y				4
Salman Bin Abdulaziz University		Y	Y	Y	Y						4
Al Jouf University		Y	Y	Y	Y						4
King Saud bin Abdulaziz Univ. for Health Sciences		Y	Y	Y			Y				4
Taif University		Y	Y	Y	Y						4
Princess Nora bint Abdulrahman University		Y	Y	Y	Y						4
Umm Al-Qura University		Y	Y	Y	Y						4
Jazan University		Y	Y	Y							3
King Khalid University		Y	Y	Y							3
University of Ha'il		Y	Y	Y							3
Qassim University		Y	Y		Y						3
Northern Borders University											
Al Baha University											
Total	1	22	22	20	15	5	4	2	1	1	

Table 2 reveals that 22 SGU are using Twitter and Facebook followed by YouTube with 20, while RSS feed (15), Flickr (5), LinkedIn (4) and Google+ (2) are used as Web 2.0 tools. This table further reveals that only one Government University is using Web 2.0 tools such as Bing, Tumblr and Scribd.

The Analysis clearly shows that King Faisal University is using maximum numbers of Web 2.0 tools (7) to disseminate and share web information. 6 SGU are using five Web 2.0 tools, while 11 universities each are using 4 Web 2.0 tools to update their information. King Saud University is the only government university, which is providing blogs service in a news portal for covering day to day events. Northern Borders and Al Baha universities didn't link any web 2.0 tools on their websites. While those universities have a profile on several Web 2.0 tools, they did not link to their websites and were not included in the study.

Web 2.0 Tools Used by Saudi Private Universities (SPU)

Table 3: Web 2.0 Tools Used by Saudi Private Universities (SPU)

Private Universities	Blogs	Facebook	Twitter	You-Tube	Linked In	Google+	Vimeo	Flicker	Total
Prince Mohammed bin Fahad University	Y	Y	Y	Y	Y				5
King Abdullah University for Science & Technology	Y	Y				Y	Y	4	
Fahad Bin Sultan University		Y	Y	Y	Y				4
al Yamamah University		Y	Y	Y	Y				4
Effat University		Y	Y	Y	Y				4
Al Faisal University		Y	Y			Y			3
Prince Sultan University		Y	Y	Y					3
Dar Al Uloom University		Y	Y						2
Total	1	8	8	5	4	1	1	1	

With illustrations from table 3, it shows that all SPU are using Facebook and Twitter, with 5 and 4 of the 8 also using YouTube and

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LinkedIn respectively. Prince Mohammed bin Fahad is using maximum 5 numbers and King Abdullah University for Science & Technology (KAUST), Fahad bin Sultan, Al Yamamah and Effat Universities 4 have access to the second most Web 2.0 tools followed by Al Faisal and Prince Sultan Universities 3 further followed by Dar Al Uloom University 2. Prince Mohammed bin Fahad is an only SPU which is using a Blog for disseminating current information.

❑ Facebook Analysis of Saudi Government Universities (SGU)

Brian[21] stated in his UK web focus blog, "Institutions are now making significant use of Facebook because of the benefits it is perceived to bring, such as the large ability to provide marketing to large numbers of users and the ability to embed other services within an environment which many users may be familiar with"?

Table 4: Government Universities Liked on Facebook by Users

Universities	Facebook Liked	User Name (FB)	Facebook's link on Website	Website's link on Facebook	Facebook Joined date
King Abdulaziz University	30,543	KingAbdulazizUniversity	Yes	Yes	5/25/2009
Jazan University	7,131	JazanUniversity	Yes	Yes	6/9/2009
Taibah University	4,219	taibahu.edu.sa	Yes	Yes	6/7/2011
Salman Bin Abdulaziz University	1204	sau.edu.sa	Yes	Yes	9/26/2011
King Saud bin Abdulaziz University for Health Sciences	7,655	KSAUHS	Yes	Yes	10/15/2011
Islamic University	4,651	iu.edu.sa	Yes	Yes	5/8/2012
King Saud University	14299	King.Saud.University	Yes	Yes	Not mentioned
King Fahd University of Petroleum and Minerals	2435	KFUPM	Yes	Yes	Not mentioned
King Faisal University	8033	kfu.edu.sa	Yes	Yes	Not mentioned
Al Jouf University	3035	ju.edu.sa	Yes	Yes	Not mentioned
Al-Imam Mohammad Ibn Saud Islamic University	*	alimamuniversity	Yes	No	Not mentioned
King Khalid University	1434	https://www.facebook.com/482131005023	Yes	Yes	2/21/2010
Taif University	2208	https://www.facebook.com/113898538651201	Yes	Yes	5/15/2010
University of Dammam	14672	https://www.facebook.com/130581383636726	Yes	Yes	6/14/2010
Almajmaah University	1732	https://www.facebook.com/134382359945784	Yes	Yes	10/19/2010
Najran University	1268	https://www.facebook.com/194489110567358	Yes	Yes	1/18/2011
Umm Al-Qura University		link not working	Yes	Yes	6/22/2011
University of Ha'il	390	https://www.facebook.com/216575565051741	Yes	Yes	7/11/2011
Qassim University	1381	https://www.facebook.com/164810496933658	Yes	Yes	9/11/2011
University of Tabuk	417	https://www.facebook.com/271156339572165	Yes	Yes	Not mentioned
Shagra University	230	https://www.facebook.com/100001484158241	Yes	No	Not mentioned
Princess Nora bint Abdulrahman University		link not working			
Northern Borders University		Link not provided on web.			
Al Baha University		Link not provided on web.			

* = Al-Imam University creates its profile as a person on Facebook as well as secured friends list also.

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Table 4 shows that 22 out of 24 SGU have linked their Facebook profiles on their websites and 19 have given back links of their universities on Facebook profiles.

This table further reveals that only 11universities created standard user names on Facebook, while 14 out of 22 Universities have mentioned their Facebook joining date on their profiles. King Abdulaziz University is the oldest SGU on Facebook.

Table 4 also shows that King Abdulaziz University has the maximum numbers of "likes" on Facebook. The University of Dammam, King Saud University, King Faisal University, King Saud bin Abdulaziz University of Health Sciences and Jazan University have "likes" on Facebook in chronological order.

Facebook Analysis of Saudi Private Universities (SPU)

Table 5: Private Universities Liked on Facebook by Users

Universities	Facebook liked	User Name (FB)	Facebook's link on Website	Website's link on Facebook	Facebook Joined Date
Effat University	5486	effat.university.official.page	Yes	Yes	2/6/2009
King Abdullah University for Science & Technology	27340	KAUSTFans	Yes	Yes	6/26/2009
Al Faisal University	2,331	alfaisaluniv	Yes	Yes	5/10/2010
Fahad Bin Sultan University	329	fahad.bin.sultan.university	Yes	Yes	4/25/2011
Prince Sultan University	677	PrinceSultanUniversity	Yes	Yes	6/11/2011
Al Yamamah University	4,808	AlYamamah.Uni	Yes	Yes	Not mentioned
Dar Al Uloom University	278	dau.edu.sa	Yes	Yes	Not mentioned
Prince Mohammed bin Fahad University	125	pmuksa	Yes	Yes	Not mentioned

Table 5 shows that all 8 SPU have Facebook profiles on websites, while all universities have provided back-to-back links of websites on Facebook profiles and have provided a standard user name, too. 5 out of 8 SPU have provided the date they joined Facebook, with Effat University having the longest association. The table 5 further reveals that KAUST has the majority of "liked" on Facebook, followed by Effat University, Al Yamamah University, Al Faisal University, Prince Sultan University, Fahad bin Sultan University, Dar Al Uloom University and Prince Mohammed bin Fahad University.

Twitter Analysis of Saudi Government Universities (SGU)

Table 6: Government Universities on Twitter

Government Universities	Followers	Tweets	Following	User name on Twitter	Twitter's link on Website	Website's link on Twitter
King Saud University	39959	8841	8	https://twitter.com/_KSU	Yes	Yes
King Abdulaziz University	26722	4781	40	https://twitter.com/kauweb	Yes	Yes
King Faisal University	22948	1353	2	https://twitter.com/KFUniversity	Yes	Yes
Qassim University	22231	209	0	https://twitter.com/qassimuniv1	Yes	Yes
Umm Al-Qura University	13891	2313	0	https://twitter.com/uqu_edu	Yes	Yes
University of Dammam	12614	693	2	https://twitter.com/ud_edu_sa	Yes	Yes
King Fahd University of Petroleum and Minerals	7899	1260	32	https://twitter.com/kfupm	Yes	Yes
King Saud bin Abdulaziz University for Health Sciences	7665	2957	56	https://twitter.com/KSAU_HS	Yes	Yes
Umm Al-Qura University	5127	2250	18	https://twitter.com/umajmaah	Yes	Yes
Al Jouf University	5111	267	2	https://twitter.com/JoufUniversity	Yes	Yes
Shaqra University	5055	241	0	https://twitter.com/shaqrauniv	Yes	Yes
Sulaiman Bin Abdulaziz University	4692	298	0	https://twitter.com/SAU_edu_sa	Yes	Yes

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Islamic University	3799	429	2	https://twitter.com/iu_edu	Yes	Yes
Jazan University	2656	1228	0	https://twitter.com/JazanUniversity	Yes	Yes
Taif University	1480	207	0	https://twitter.com/TaifUniversity	Yes	Yes
King Khalid University	690	28	3	https://twitter.com/kkueduksa	Yes	Yes
University of Tabuk	398	40	5	https://twitter.com/u_tabuk	Yes	Yes
Taibah University	304	4	0	https://twitter.com/taibahuen	Yes	Yes
Najran University	291	90	0	https://twitter.com/najranuniversit	Yes	Yes
Al-Imam Mohammad Ibn Saud Islamic University	1866	213	0	https://twitter.com/imamue	Yes	No
University of Ha'il	192	2	0	https://twitter.com/uoh_official	Yes	No
Princess Nora bint Abdulrahman University				Link not working	No	
Northern Borders University				Link not provided	No	
Al Baha University				Link not provided	No	

Table 6 reveals that 22 out of 24 SGU have linked their Twitter profiles on their websites, with 19 universities having provided back links of university websites on Twitter.

11 Universities have more than 5,000 followers, led by King Saud University 39,959 and including King Abdulaziz 26,722, King Faisal 22,948, Qassim University 22,231, Umm Al-Qura University 13,891 and University of Dammam 12,614.

Taibah, Tabuk, Nazran and Ha'il universities each has less than 500 followers and less than fifty tweets, while 2 Universities have no links - therefore, no followers as well Princess Nora University's links not properly working.

King Saud bin Abdulaziz University for Health Sciences has the maximum amount of profiles "following" (56), with the next closest universities in terms of "following" including King Abdulaziz University (40), KFUPM (32), AlMajmah (18) and King Saud University (8).

- **Twitter Analysis of Saudi Private Universities (SPU)**

Table 7: Saudi Private Universities on Twitter

Private Universities	Followers	Tweets wing	Follo-	User name on Twitter on Website	Twitter's link link on Twitter	Website's
King Abdullah University for Science & Technology	9455	554	158	https://twitter.com/kaust_news	Yes	Yes
Al Faisal University	5103	2850	116	https://twitter.com/alfaisaluniv	Yes	Yes
Effat University	4262	3945	572	https://twitter.com/effatuniversity	Yes	Yes
Al Yamamah University	3274	2011	37	https://twitter.com/AlYamamah_Uni	Yes	Yes
Dar Al Uloom University	939	239	13	https://twitter.com/dau_university	Yes	Yes
Prince Sultan University	938	11	0	https://twitter.com/PSU_RUH	Yes	Yes
Fahad Bin Sultan University	195	95	5	https://twitter.com/fbsuniversity	Yes	Yes
Prince Mohammed bin Fahad University	84	24	1	https://twitter.com/pmu_saudiarabia	Yes	Yes

In table 7 KAUST has the most followers 9455 with Al Faisal 5103, Effat University 4262, AL Yamamah University 3274, and Dar Al Uloom University 939 rounding out the top five in terms of followers. Effat University led in tweets 3945 followed by Al Faisal 2850, Al Yamamah University 2011, KAUST 554 Dar Al Uloom, Fahad bin Sultan 239, Prince Mohammed bin Fahad University 24 and Prince Sultan University 11.

Table 7 also reveals that all 8 SPU have Twitter links on their websites and websites on their Twitter links. Effat University has 'following' most Twitter profiles 572, significantly more than the other universities including KAUST 158 Al Faisal 116 and AL Yamama University 37.

FINDINGS

The important findings of this study can be summarized as follows:

- It revealed that the Web 2.0 tools like Facebook and Twitter are most popular among Saudi Universities, and while Flicker is less

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popular it appears to be a powerful tool of Web 2.0.

- The study indicates that Wiki and Blogs are not popular in Saudi's higher education and that KSU is the only institution using Blog in the form of News Portal since 2007, among SGU.
- The study shows that the King Faisal University in Government and Prince Mohammed bin Fahad in Private Universities in the Kingdom are using the most Web 2.0 tools to disseminate information throughout the world.
- The study revealed that 22 SGU and all 8 SPU are using Twitter and Facebook for instant messaging.
- King Abdulaziz University is receiving the most 'likes' on Facebook. In the case of Private Universities, KAUST has the greatest numbers of Facebook "likes."
- In Saudi, 11 of 24 government universities and all eight private universities have standard user names on Facebook.
- Shaqra and Imam Universities created their Facebook profile as a person and Umm Al-Qura, Princes Nora Universities has a Facebook link on their websites, but they do not reference their Facebook profiles.
- Some Govt. Universities recently created a profile on Twitter, but are not active on Twitter.
- The study revealed that KAUST had 9,455 followers by on Twitter, but only 554 tweeted.
- In terms of profiles "following" on Twitter, government university King Saud bin Abdulaziz University for Health Sciences had 56, followed by King Abdulaziz University with 40, but among private universities Effat had 572 and KAUST 158.
- The RSS service is not provide by any Saudi Private Universities.
- Only four Saudi government and two private universities in Saudi have posted on Facebook's "official" page and only two government universities have posted on Twitter's official page.
- The study indicated that private universities are more consistent than public universities in terms of having standard user names and giving back the link of their websites on Facebook and Twitter profiles.

SUGGESTIONS

Institutional use of Twitter is relatively new, so sound and consistent practices have not been established. Surveys of web 2.0 tools usage can help to identify effective patterns from which it may be possible to determine the best practices[22]. On the basis of this survey, and Brian Kelly suggestions, the authors have made some suggestions for Saudi Universities.

- All Saudi universities must provide the link of all web 2.0 tools with logos on their websites. They should also write on their web 2.0 profile official page and give their link of their university's website so the user can easily differentiate. It is also desirable policy of use for Web 2.0 tool should be linked with his profile.
- While browsing Facebook profiles, the author observed during the browsing Facebook profiles of Saudi Universities that some universities have more than one Facebook profile. They should have a primary profile to attract more followers.
- Princess Noura, and Umm Al-Qura Universities' Facebook and Twitter link should direct to their Facebook and Twitter profiles.
- Northern and Al Baha universities should create their Facebook and Twitter profiles and linked on universities websites.
- The user name of all applications should be standard on all web 2.0 tools so user can easily remember.
- Shaqra and Imam Universities should create their Facebook profiles as an "organization" rather as a "person" so it will be easy to "like" and share something with users on their profiles.
- An appropriate profile format should be provided. This could be used, for example, to clarify the status of the Twitter account, the scope of usage and to promote the host institution.
- The location of the host institution should be provided, in text and as geo-located metadata to make tweets available to location-aware services.
- An institution should develop a policy on following other Twitter users. There is no need to follow other Twitter users, especially if the Twitter account is used for one-way broadcasting of information.

CONCLUSION

Currie[24] states "Implementing Web 2.0 tools to coordinate communication and training creates a dynamic, interactive system for sharing procedures, ideas, and new developments within a reference services department". The present study also reveals that the Kingdom's private universities have more consistency, with all eight having Facebook profiles and all Facebook profiles having standard user names. 22 of 24 Saudi Government Universities have Facebook profiles and 12 use standard user names.

King Saud, is the only Saudi Government University, which is providing Blog service to its community in form of KSU News Portal on WordPress though Prince Mohammed bin Fahad is another only Saudi Private University which is providing Blog service but it's not updating from 2010. King Saud University is also proving its own video services named 'ShaSha', KSU community can upload their academic and sports related videos just like 'YouTube' though KSU also has its channel on YouTube. Facebook and Twitter are the two most familiar Web 2.0 tools, but no Internet tools are bad. Frequent benefits - personal, professional and academic can be derived from all Web 2.0 tools, as long as they are used responsibly.

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ICT Usage in Government Engineering College Libraries in Punjab: A Case Study

Pardeep Rattan

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Librarian
Govt. College
Mohali

Corresponding Author
Pardeep Rattan
pr2740@gmail.com

ABSTRACT

The revolutionary advancements in Information and Communication Technologies (ICT) have substantially paced the growth of libraries all over the world. ICT particularly facilitates speedy library operations, services and enhances connectivity for access and delivery of information. The offer of new information and communication products and services by the libraries has provided an opportunity to the information seeker to have required and pinpointed information in no time via internet, databases, and powerful search engines through the applications if ICT even on their android based or smart phones these days. The present paper studied the usage of Information Communication Technology (ICT) products and services implemented in the libraries of government engineering colleges in the state of Punjab. This study is based on the primary data gathered by survey instrument of questionnaire from the students of all the six government engineering colleges of Punjab.

KeyTerms: ICT, Knowledge Databases, Library Networking, Library Automation.

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INTRODUCTION

Libraries are the nerve centres of any academic or research institution and the massive advancements in ICT have provided the libraries new opportunities to deliver their services in a better, faster, user centric way in a 24x7 time format, and at the doorstep of the user. The computers which started their journey in 1940s have now made inroads into each and every activity which influences the human being. The World Wide Web, multimedia and internet based applications, cheaper, reliable and powerful computers have made easier the task of satisfying the needs of library user sitting in any corner of the world. The libraries attached to the schools, colleges, universities, technical institutes, research institutes, museums and archives are all a boon to the information seeker.

OBJECTIVES

The primary objective of this study is to gauze the level of implementation of information and communication technology products and services in the libraries of government engineering colleges in Punjab and also to see whether the students are availing the benefits of ICT. The other objective of the study is to look for other effective options to serve the learning community better by means of ICT in these colleges.

LITERATURE REVIEW

Cholin[6] studied the application of information technology for effective access to resources in Indian University libraries where he opined that because of ICT the users are able to find, select, download and print the relevant information to satisfy their academic and research needs by overcoming distance and time hurdles from any corner of the country.

Kumar[2] in their study on use of ICT in college libraries in Karnatka concluded that much more is required to be done to popularize the introduction of ICT in Indian scenario. Inspite of the positive attitude of the library professionals towards the adoption of ICT the major constraints for the smooth implementation of ICT in libraries are the provision of sufficient budget, skilled manpower and training for library personnel.

The NACLIN report by Kaul[9], network director of DELNET in Goa convention stressed upon the need of finding unique and new management techniques focused towards libraries whereby newer methods of learning know how about ICT is required and then these need to be passed on to the at the grass root level in rural areas and also to the institutions which find it difficult to support ICT infrastructure. The librarians should be encouraged to use web 2.0 tools in routine jobs, the digital techniques and web resources at any cost to compete with the outer world.

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Thomas[1] have focused on the issue that a careful planning in the implementation of ICT in colleges in India which is still in the initial stages. The UGC-INFLIBNET should be at the center stage to provide training, funds and guidance for encouraging the state governments to come forward to embrace the benefits the ICT offers. Inadequate financial resources, non-availability of trained IT professionals and training, inadequate management support are some of the hurdles in the implementation of ICT in libraries as pointed out by the researchers.

RESEARCH METHODOLOGY

The present study was conducted on the libraries of government engineering colleges in the state of Punjab, India. The sample population under the present study is comprised of college students from the 6 engineering colleges. The sample of the population was selected by random sampling method and only AICTE approved government colleges were selected for the study. The primary data was collected by means of survey instrument for which a questionnaire was designed to achieve the objectives of this study. The questionnaire was distributed among students of the different selected colleges. The investigator personally visited the colleges for the distribution of questionnaires and for making a better understanding of the questionnaires to the sample population and also to get first- hand information about the libraries and the colleges to satisfy the objectives of the study. The questionnaire was explained to the respondents by the investigator so as to achieve the target of maximum responses.

LIMITATION OF THE STUDY

The present study has been confined to the study of government engineering college libraries only within the state of Punjab, India and only the students of the colleges under the present study have been chosen as respondents.

DATA ANALYSIS

This section presents the analysis of data gathered for the present study by means of a structured questionnaire which was distributed among the students of 6 engineering colleges selected for the study. It was decided that students will be selected randomly irrespective of their age, gender, course of study, year of their study in the college, socio-economic and cultural background. A sample of 25 students is to be selected from each of the 6 engineering colleges. Thus, the total population of sample for students comprised of 150 students and out of this the researcher received the response of 126 students which constitutes 84% the total sample population for students.

The questionnaire for the students was designed primarily keeping in mind the objectives of the study and also to have a fairly good understanding of the outcome of the responses. The questions deal with the awareness of students regarding ICT based services being provided in their libraries and about their perception of the existing infrastructure, their requirements, attitude of the library staff in solving the difficulties being faced by students while using ICT based library services.

The data collected from students was tabulated on MS Excel spread sheets and simple percentage method was used to arrive at the results of data analysis. The graphical representation is done by columns and bar graphs.

❑ Personal Information

This section deals with the personal information of students about their age, gender, and their stream of study, social background and students' compatibility with computers.

Table 1: Age and Gender Ratio of Students

Age	Respondents	Gender	Respondents
18-23	120(95%)	Male	74(59%)
24-29	5(4%)	Female	52(41%)
No Response	1(1%)	No Response	00
Total	126	Total	126

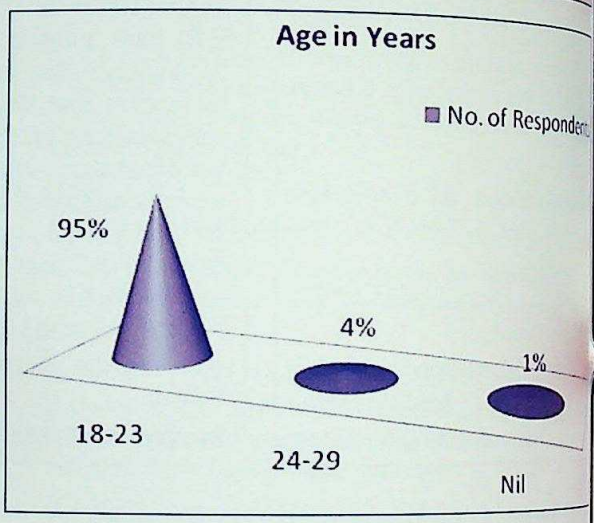

Fig.1: Age of Students

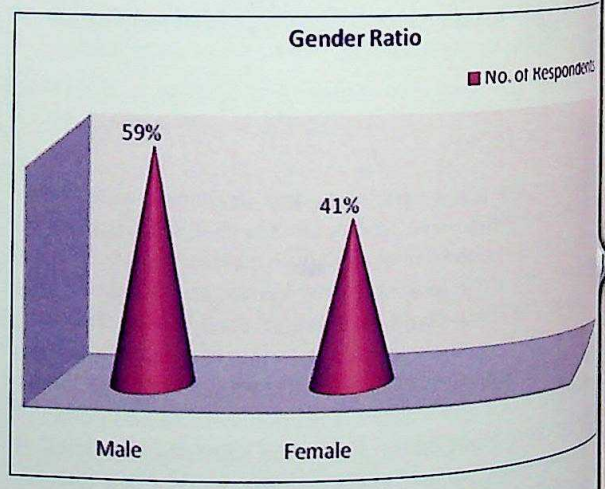

Fig.2: Gender Ratio of Students

Table 1 indicates that 95% of the respondents belonged to the age group of 18-23 years and around 4% fall in the category of 24-29 years. A slight less than 1% of the respondents skipped the question and did not provide any response to the question of age. Out of 126 respondents, 59% of the respondents are boys while 41% are the girl students.

❑ Social Background, Stream and Compatibility with Computers

Below table 2 shows that respondents from the rural background constitute 43.65% of the total population of the students and

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Table 2: Social Background, Stream and Compatibility with Computers

Social Background	Users	Stream	Respondents	Compatibility with computer	Users
Rural	55 (43.65%)	B.Tech	112 (88.89%)	Yes	123 (97.62%)
Urban	69 (54.76%)	M.Tech	11 (8.73%)	No	2 (1.59%)
No	2 (1.59%)	No Response	3 (2.38%)	No Response	1 (0.79%)
Total	126 (100%)	Total	126 (100%)	Total	26 (100%)

majority 54.76% belonged to urban areas. A greater majority of respondents, around 88.89% are doing Bachelors of Technology and only 8.73% students are from the Master's Degree. A majority of 97.62% of the respondents is comfortable in using computers and only 1.59% of the respondents have shown their disagreement with the compatibility of computer usage.

❑ ICT Based Library Services in the Libraries

Table 3: ICT Based Library Services in the Libraries

Services	Yes	No	No Response
Transactions	82 (65.08%)	5 (3.97%)	39 (30.95%)
OPAC	22 (17.46%)	28 (22.22%)	76 (60.32%)
Audio/Video Material	15 (11.90%)	35 (27.78%)	76 (60.32%)
CD-ROMS	9 (7.14%)	31 (24.61%)	86 (68.25%)
Internet Surfing	27 (21.43%)	24 (19.05%)	75 (59.52%)
Internet Facilities	29 (23.02%)	22 (17.46%)	75 (59.52%)
E-Mail	18 (14.28%)	27 (21.43%)	81 (64.29%)
Databases (Online)	10 (7.94%)	29 (23.01%)	87 (69.05%)
Fax	12 (9.52%)	31 (24.60%)	83 (65.88%)

Although the majority of the respondents are from urban areas but the degree of awareness about the libraries providing computerized library services seems to be almost balanced as 54% of the students responded that they are aware of the fact that their college library is fully computerized and a little lesser 46% responded negatively to the question of their awareness about the computerized library services in their college. A large majority of respondents comprising 73% of the total population responded that they are not using computers in any way in their library and only 21% of the students admitted to the use of computer in the libraries. 7% respondents did not provide any answer to this question. The major facility which the students are availing is of computerized issue and return of the library documents. Such respondents who responded in affirmative are 65.08% while 30.95% students did not provide any answer. The proportion of such students who are using OPAC is 17.46% and 22.22% students said that they are not making use of OPAC. A major proportion of 60.32% the respondents skipped the question for answer. A very low percentage of respondents, only 11.90% are using the audio-video material available in the library. 21.43% respondents admitted that they are availing the facility of Internet Searching. Electronic Mail which today is the most common and prevalent mode of communication is being used by 14.28% of the respondents in the library.

❑ ICT Infrastructure in Libraries

Table 4: ICT Infrastructure in Libraries

Infrastructure	Yes	No	No Response
Computer Terminals	57 (45.24%)	63 (50%)	6 (4.76%)
Internet Facility	40 (31.75%)	83 (65.87%)	3 (2.38%)
Terminals with Internet Connectivity	44 (34.92%)	78 (61.91%)	4 (3.17%)
Need of more Computer Terminals	95 (75.40%)	24 (19.05%)	7 (5.55%)
User friendly computer set up	65 (51.59%)	52 (41.27%)	9 (7.14%)
Seating capacity/ lighting/ furniture/ ventilation	99 (78.57%)	21 (16.67%)	6 (4.76%)

The above table 4 reveals the perception of library users in terms of present ICT infrastructure which has been provided for the direct use of the respondents. 45.24% felt the sufficiency in terms of number of computers in the library while 50% of the respondents affirmed the insufficiency of computers. 65.87% respondents feel that they do not have access to internet facility available in the library and 31.75% respondents feel the accessibility to internet otherwise. A larger proportion 61.91% feel that the existing number of computer terminals for the use of library users do not have internet connectivity but 34.92% of the respondents are of the view that all computer terminals have internet facility. A majority of the respondents almost 52% said that the present computer set up in their libraries is user friendly and they do not find much difficulty to use the IT based library services.

A fairly large proportion of the respondents, 78.57% are of the view that the lighting, seating capacity and furniture are sufficient enough to accommodate a sufficient number of users comfortably but 75.40% of the respondents feel the need of more computer terminal for common use in the libraries.

The responses reveal that a large majority of the respondents are satisfied with the existing infrastructure in terms of seating capacity, ventilation and lighting and feel the present setup as user friendly. However, a major proportion of the respondents feel the need of more computer terminals and also of having an access to internet facility in the library.

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CONCLUSION

The above data analysis and its graphical representation has now provided us a clear picture about the present level of ICT based library services and the available infrastructure to support these services in the engineering college libraries run by state government in the state of Punjab. Based on the data analysis the researcher has observed that:

- A majority of the respondents (95.24%) fall under the age group of 18-23 years.
- 89.89% of the respondents are doing their bachelor of technology in different govt. colleges in the state of Punjab.
- Almost 98% of the respondents are comfortable in using computers.
- Almost an equal percentage of respondents are aware and unaware of their libraries having computerized library services.
- A majority of around 65% of the users are availing the facility of computerized circulation section in their libraries.
- A majority of the students have not provided any answer of using OPAC, Audio-video material, CD-ROMS, Internet searching, Internet facilities, E mail, online chatting, Offline and Online databases.
- 50% respondents are of the view that existing computer terminals are not sufficient for the present use.
- A majority of the students have no access to internet in the library and they also feel that all computers do not have internet access.
- In terms of seating area, lighting, ventilation and furniture a majority of the respondents have expressed their satisfaction.
- A large majority of 75.40% respondents feel the need of more computer terminals within the library.

The poor response of students towards the non-usage of existing library ICT facilities, services and infrastructure may be due to unawareness among students because of lack of training facilities and orientation programme for the library users, non-supportive attitude of the library staff, lack of marketing initiatives on the part of library personnel for the ICT based library products and services, budgetary constraints and the librarian being not the part of decision making body for the growth of the library.

SUGGESTIONS

The college librarian should be a part of any decisions that are taken for the benefit of the library users. He/ She should have certain financial powers with him and sufficient budgetary provisions should be made to meet latest technological advancements in ICT and telecommunications which are to be implemented in the library. All India Council of Technical Education (AICTE), New Delhi which regulates and approves the establishment of engineering colleges in India must have a mechanism of regular monitoring of the standards being followed set by AICTE for these colleges. Periodic orientation and training programmes should be arranged for library users so as to make them aware of the existing library services and also to ensure their proper utilization. The library staff should undergo training programmes to have latest know how in their field and some morale boosting sessions for the staff as a whole should be arranged.

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Assessing the Effectiveness and Usage of Library Resources and Services of Einstein Academy of Technology and Management, Bhubaneswar: A Faculty Oriented Study

Nilaranjan Barik

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Librarian
Einstein Academy of Technology and Management
Bhubaneswar- Orissa

Corresponding Author
Nilaranjan Barik
nil.shyamanjana@gmail.com

ABSTRACT

The present study is conducted to evaluate the library services and resources of Einstein Academy of Technology and Management (EATM), Bhubaneswar. In this stydy the investigator distributed a simple questionnaire among 72 faculty members from all the departments of the college to obtain their satisfaction, views and suggestions about the services, resources and staffs attitudes. Only 60 faculty members returned the questionnaire at a ratio of male and female as 42 and 18 respectively. The detail procedure of study, methodology and research findings is described in the study. It is found that the overall satisfaction level of faculty members towards library services is about 81.66%. The quality of services, adequacy of e-resources, and the nature of IT enabled services are comparatively good in the library. But adequacy of print resources is not satisfactory. About 15% faculty members disagree about the adequacy of print resources. One another thing also revealed from the study that only 6% faculty members spend more than 2-3 hours in the library whereas 40% of them visit the library on daily basis.

KeyTerms: Quality Assessment, Information Seeking Behavior, Information Communication Technology.

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INTRODUCTION

Library is the epic center of study and research in every academic institution. A well-stocked library with modern resources and equipment can serve better to its user's community. With the passage of time information seeking behavior of users has changed. Also information communication technology has brought a revolution to search for new and new information. Now users need updated information within the moment of their need. So the academic libraries are to be developed their resources, services and process of information delivery. The collection should be adequate, qualitative and updated. The process of information delivery should be as simple as possible and there should not be any ambiguity in information. The library staffs need to be so proficient to face the users. Particularly in the library it is extremely important to understand who the users are, what are their needs, and how those needs can be satisfied by the library? So assessment of library services is unavoidable to measure the quality of services as it is able to meet the information requirements of the users.

Profile of EATM, Bhubaneswar

Einstein Academy of Technology And Management is an ISO 9001-2008 Degree Engineering College situated in Bhubaneswar. It provides teaching in six core engineering branches like Civil Engineering, Computer Science and Engineering, Electronics Communication Engineering, Electrical and Electronics Engineering, Electrical Engineering and Mechanical Engineering. The Central Library of EATM is partially automated with SoftLib library management software. It has a good collection of printed and electronics resources in the library. It is an institutional member of DELNET, New Delhi and subscribes J-Gate and Wiley India for e-resources.

LITERATURE REVIEW

So many research articles are referred to bring a clear thought content of the study. Khan[1] in his study revealed that JNU library users are more advanced in use of e-resources; internet than JMI Library users. The main purpose of library visit of JMI Library users are for books lending, whereas JNU Library users visit library for

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consultation of Journals, magazines, News Papers and books. Sivakumaren[6] in his study stated that research scholars were asked to indicate the library resources used for their research. Result shows that 60(58.3%) research scholars used Internet most frequently for their research. Electronic journals are used by (51.5%) users. 38(36.9%) users used print journals and 28(27.2%) users used full-text databases for their research. Only 26(25.2%) users used books for research. The least used resources were bibliographic database and theses and dissertations as (17.5%) & (11.7%) respectively. Sohail[7] in his survey defined six determinants of quality service in library like reliability, responsiveness, assurance, access, communication and tangibles to measure the different dimensions of quality of services in library. Result shows that the positive response of service quality dimension in library is highest tangible (70.62%), followed by access, (61%), reliability, (59.50%), assurance (56.50%), responsiveness, (52.91%), communication, (52%). On the other hand negative response for service quality dimension in library is maximum access factor, (37.20%), followed by both reliability and communication, (32%), responsiveness (28.33%), and followed by tangible, (27.50%), assurance, (26.50%). Mulla[4] in his study revealed that majority (107, 82.31%) of respondents visits the library to borrow text books and (41.54%) prepare for competitive examinations. Whereas 53.85% of respondents use the library OPAC. 39.23% of users are happy with their library automated services. Kumar[3] in his study stated that faculty members spend too less time in library comparison to research scholars and other users. Result shows that library resources are not updated on the demand of time. The existing resources are also not completely used by the users. Only 10% users come library to borrow and return books. Textbooks and magazines are used by 16.67% and 13.33% users respectively. Library staffs are incompetent and unqualified. On the overall satisfaction rate result showed that 10% users are totally dissatisfied with the quality of library services. Kumar[2] in his survey disclosed that only small percentages of users were using library networks for the exchange of information resources but a large majority of users were satisfied with the overall functions of the library. Nimsomboon[5] in his study revealed that the service quality attributes provided in Thammasat university library of Thailand don't meet user desired expectations and the most problems are related to insufficient library collection, quiet place for study, and service mind of staffs. On the other hand remote access of the library resources is very poor. Library users wanted that the resources should be updated on website of the University.

OBJECTIVES

- To find out the frequency of visiting the library by the faculty members.
- To know the types of information access by the faculty.
- To understand the attitudes of faculty towards different library services.
- To assess the opinion of faculty members towards the library staff.
- To understand the satisfaction level of faculty on different dimensions.

SCOPE & LIMITATIONS

The study is confined to the Library of Einstein Academy of Technology and Management (EATM), Bhubaneswar. Faculty members are selected from all the teaching departments of EATM. Out of 72 faculty members only 60 faculty members those who returned the questionnaire are considered for the study at a ratio of male and female as 42 and 18 respectively.

METHODOLOGY

In this present study, a well-structured questionnaire has been prepared. Questionnaires are distributed among 72 faculty members of all the teaching departments of the college and only 60 respondents returned the filled questionnaires to the investigators. Also the investigator invited personal opinions from the respondents. The collected data are analyzed, classified and tabulated by simple statistical methods, table and percentage to assume the objectives of the study.

RESULTS & DISCUSSIONS

Received data were tabulated and analyzed using simple scientific methods to bring accuracy and reliability of the study. The following results depicts in the study are:

❑ Frequency of Visiting the Institution Library

There are two modes of visiting a library by the users. Usually users visit the library on day basis and time basis. On day basis of visiting a library, the frequency of days visited by a user within a definite period is calculated. The frequencies are daily, once in 2-3 days in a week, once in a week, once in 15 days etc. On time basis of visiting a library, the time spent by a user in the library is counted. In this following table researchers presented the data on day basis of visiting the EATM institution library by the faculty members.

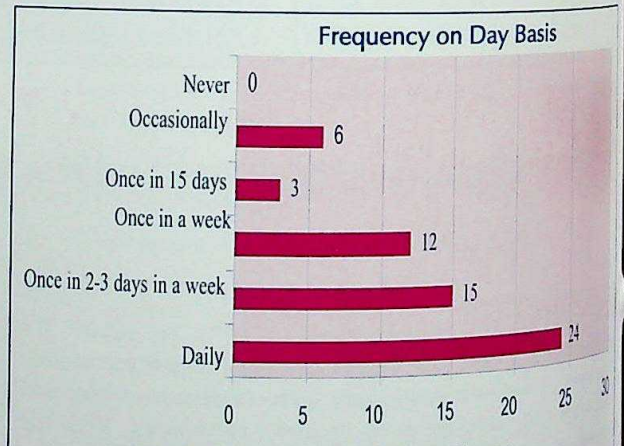

Fig. 1: Frequency of Visiting Library

From the above figure 1, it is clear that 24(40%) faculty members visit the library in daily basis, while 15(25%) visit the library once in 2-3 days in a week. Besides it 12(20%) faculty members visit the library once in a week, and 6(10%) faculty members visit the library occasionally. The lowest number of faculty 3(5%) visit the library once in 15 days and no response for last option never.

❑ Frequency of Time Spent In the Library

In this following figure the time spent by the faculty members when visiting the institution library are presented.

The figure 2 shows that about 36(60%) faculty spent less than one hour and 18(30%) faculty spent 1-2 hours in the library. Next to

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(10%) faculty spent 2-3 hours a day and no faculty members spent more than 3 hours in the library.

Interaction with a few respondents regarding short duration of staying in libraries indicates that:

- In the age of Internet the library resources can be accessed even outside the library as more and more library resources are available on electronic media.
- Maximum faculty members are over burden with their class assignment.

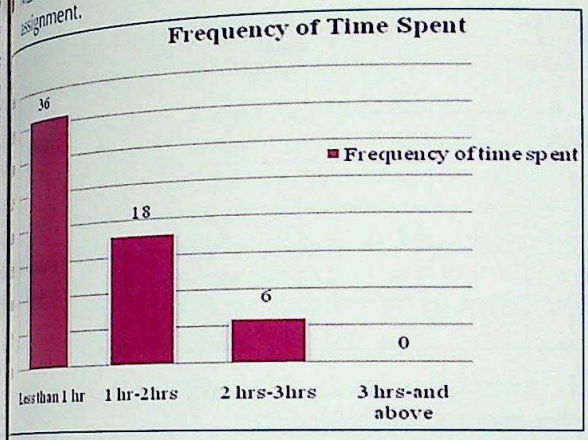

Fig. 2 : Frequency of Time Spent in the Library

Types of Information Services Received by Faculty

To meet the diversified needs of users' groups, a good library provides these following information services like new arrivals, current awareness services, new developments, reminders, new services, conferences etc. This following figure depicts the most common information services that users receive from the institution library.

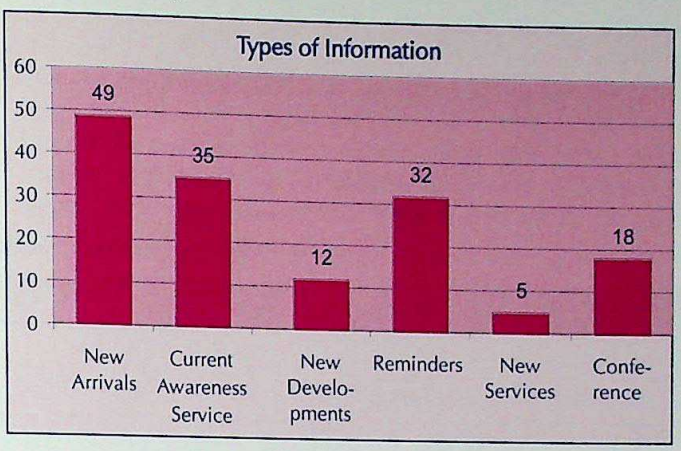

Fig. 3 : Types of Information Services

The Figure 3 shows that highly received information services from library is new arrivals to the library 49(81.66%) followed by Current Awareness Services 35 (58.33%). The least received services are New Services by 5(8.33%) faculty members. Respectively Reminder services with 32(53.33%), Conferences with 18(30%) and New developments with 12(20%) faculty members.

❑ Attitudes of Faculty Members Towards the Library Services/ Features

Here faculty members were asked to identify and rate the library services that these are available in their institution library.

Table 1: Attitudes of Faculty towards the Library Services/ Features

Features	Attitude of Faculty									
	Strongly Disagreed		Disagreed		Somewhat Disagreed		Agreed		Strongly Agreed	
	n	%	n	%	n	%	n	%	n	%
Library is a Quiet Place	0	0	0	0	4	6.67	8	13.33	48	80
Documents & CDs/ DVDs are Properly Arranged	0	0	5	8.33	2	3.33	21	35	32	53.34
Physical Access is Easy	0	0	1	1.67	1	1.67	8	13.33	50	83.33
Working Hours are Convenient	0	0	3	5	5	8.33	24	40	28	46.67
Comprehensive Print Resources	0	0	0	0	6	10	24	40	30	50
Collection of CDs/ DVDs/E-Books/ E-Journals etc.	2	3.33	6	10	2	3.33	24	40	26	43.34
OPAC	0	0	0	0	0	0	12	20	48	80
Remote access of Library Resources	0	0	0	0	36	60	20	33.33	4	6.67
Resources are Available through Website	48	80	8	13.33	4	6.67	0	0	0	0
Library allows On-Line Reservations/ Renewals	38	63.33	14	23.34	8	13.33	0	0	0	0
Good Networking with Other Libraries	0	0	16	26.67	34	56.67	10	16.66	0	0
Photocopying Facility	0	0	0	0	0	0	18	30	42	70
Internet Connection	0	0	0	0	0	0	12	20	48	80
Response of queries via LAN/ Internet is Very Fast	0	0	0	0	18	30	36	60	6	10

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Table 1 depicts that the 50(83.33%) faculty agreed with physical access in the Library, Library has a quiet place, easy to use of OPAC, Internet connection, Resources are available through Websites agreed 48(80%) faculty. Photocopying facility with 42(70%), Print documents and CDs/ DVDs are properly arranged with 32(53.34%), 34(56.67%) faculty neutral with good networking with other Libraries, 48(80%) faculty strongly disagreed with the online resources available in the Library. Similarly 52(68.67%) members disagreed with the Library online reservation/ renewal facility.

❑ Opinion of Faculty Members Towards the Library Staff

In every system human power plays a pivotal role to reach the services before the users group. A well-qualified and dynamic staff can better understand the mentality and needs of the users. They must have knowledge and ability to deliver promised services in the library.

Table 2: Opinion of Faculty towards the Library Staff

Opinion	Strongly Agreed	Agreed	Somewhat Agreed	Disagreed	Strongly Disagreed
Build up Confidence In Users	22	24	10	4	0
Giving Users Individual Attention	15	30	13	2	0
Respond Users' Queries	45	15	0	0	0
Knowledge to Answer User Questions	15	30	12	3	0
Understand the Specific Needs of the Users	22	19	12	7	0
Ability to Deliver the Services on Time	20	30	6	4	0

Table 2 depicts that 24(40%) agreed with staff build up confidence in users, 30(50%) concur that library staff giving users individual attention, 45(75%) agreed with the quality of staff to respond users queries, 22(36.67%) agreed with the ability of staff to understand the specific needs of the users, 30(50%) faculty agreed with the knowledge of staff to answer the users questions.

❑ Satisfaction level of Faculty Members on Different Dimensions of Library Services

The different dimensions of library services considered here to assess the satisfaction level of users are quality of library services, adequacy of print resources, adequacy of e-resources, and nature of IT enabled services being delivered in the library. Following figure depicts the overall satisfaction level of faculty members towards their institution library.

Table 3: Satisfaction Level of Faculty on Library Services

Library Services	Satisfaction Level				
	Strongly Satisfied	Satisfied	Neutral	Dissatisfied	Strongly Dissatisfied
Library Facilities, Services and Staffs	9	49	2	0	0
Quality of Library Services	8	29	13	10	0
Adequacy of Print Resources	18	21	12	9	0
Adequacy of e-Resources	21	33	6	0	0
IT Enabled Services	6	39	15	0	0

The overall rating based on the experience of the users about the resources, services and staff of the library were presented in the table. The frequency distribution in table shows that about 49(81.66%) of users are satisfied with their library facilities, services and staff whereas 39(65%) satisfied with the nature of IT enabled services in the library and 33(55%) users said they are satisfied with the adequacy of E-resources while 29(48.33%) satisfied about the quality of the library services and 21(35%) users shown their same view on adequacy of print resources. But one important thing is revealed from the study that the percentage of dissatisfied respondents in term of adequacy of print resources is 9(15%) and inviting the attention of library authorities towards the improvement of same.

MAJOR FINDINGS

While doing the ground work for the study the investigator has analyzed the data and came through some of the major findings which are mentioned below:

- Almost all respondents viewed that they access books from library by individual presence.
- Users get the recent activities of library by circulars, e-mail and phones.
- Types of information they get from library are mostly new arrivals of books and reading materials and reminders about their circulation of books and other library materials.

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- Only 24(40%) faculty viewed that, they access library daily basis.

The frequency of time spent in the library shows that only 6(10%) of faculty spent 2-3 hrs in the library, whereas not a single faculty spent more than 3 hours. It's a too less percentage of total faculty members.

CONCLUSION

In this study the investigator tried to assess the library services of Einstein Academy of Technology and Management, Bhubaneswar based on library resources exist, information services being offered and staffs' proficiency to deliver promised services. It is found that majority of the faculty members are satisfied on the resources and services of the library. Only few faculty members viewed about the poor adequacy of print resources. In every academic library users want more and more services and resources from their institution library. Because it helps for their day to day study work. So in this study faculty members wants for the increasement of quantity of print resources, publication of e-resources in the college website and enable the users for online reservation of books.

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Open Access Publishing in India: An Analysis of Directory of Open Access Journals (DOAJ)

Ramesh Pandita

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Assistant Librarian
BGSB University
Rajouri- Jammu

Corresponding Author
Ramesh Pandita
rameshpandita90@gmail.com

ABSTRACT

The concept of open access publishing has flourished all across globe and so has it gained ground in India. India has been contributing to open access publishing from the very beginning, rather since the realization of need and importance of open access publishing. The present study has been undertaken to assess the scenario of open access publishing in India during the past decade. To undertake the present study data has been retrieved from the Directory of Open Access Journals (DOAJ), which is more a case of data mining. In the present study attempt has been made to work out on the growth of open access publishing in India during the last decade viz. for the period 2002-2012, its contribution to open access publishing at Global Level, continental level and many other similar things related with the overall scenario of open access publishing in India. Attempt has also been made to correlate other studies already undertaken in the field of Open Access (OA) publishing through literature review. The data has been tabulated and analyzed as per the defined objectives of study. Data for analysis was retrieved on December 31, 2012 which on date hosted 8518 journals on its website from 121 countries all across the globe.

KeyTerms: Open Access, DOAJ, India, Asia, Global Level, Continental Level.

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INTRODUCTION

Open access (OA) as the term itself suggests is simply something which can be owed as accessible without any hurdle or hiccup. On the similar lines open access publishing is something whereby we make literary output accessible and available to one and all globally without paying anything for it. The concept of open access publishing has received so much of acceptance all across the globe that presently more than 65% counties of the world believe in OA Publishing and as such publish research results in open access format. Realizing the importance of expanding the frontiers of knowledge beyond the borders, most of the leading research institutions all across the globe have started publishing their research results in open access format[1]. Previously, research results used to get published in closed access format, as such used to have limited viewership with limited visibility and ultimately limited applicability. Open access has not only opened up new vistas of publishing and making the research output easily and freely accessible to common masses but has equally increased the applicability of research output. Realizing the importance and impact of knowledge sharing through all means including open access, more and more research organization, institutions, scholars and people at large have switched over to open access for both publishing and accessing purposes.

Weaning library budgets and increasing costs of research journals always acted as an impediment in the dissemination of research output to its optimum. People in countries like India used to remain deprived of the most valuable information, mostly concerning areas like health, education, economy, polity and many more and this was just because of the limited or no access to information for the want of limited resources. Fernandez[2] opines that developing countries suffer at the hands of closed publishers which bogs down the research output of these countries and India do suffers at this front, to which he advocated open access as a solution to remedy this deficit.

Genesis of Open Access Publishing can be traced back to the year 1990 when the concept was at its infancy stage. In the year 1990 only 5 journals were engaged in open access publishing which has grown considerably over the period of time and for that matter we can see more than 8500 open access journals are

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...sed on the DOAJ as on date.

...TERATURE REVIEW

...nce the advent of Open Access Publishing a number of studies ...e been carried out by scholars all across the globe from time to ...e, covering various aspects of open access publishing. ...king at the advantages of the open access publishing most of ...e scholars have advocated towards the promotion of this ...mat. Availability of valued research output freely on internet ...ped the open access publishing to gain momentum. Bluh[3], ...k & Shearer[4] were of the view that all scientific and scholarly ...ature should be made available on internet free of cost. ...king available research output freely to public helps increase it ...ibility, impact and ultimately it usage, which should always be ...ority consideration while making research results out.

...ile carrying out his study on open access publishing Falk[5] ...served that compared to 5 journals published in to open access ...mat in1992, the number grew over 1200 OA journals in the ...ar 2002. The other studies carried out in the field of open ...cess publishing include, Lawrence[6], Chan[7], Deschamps[8], ...machandran[9], Harnad[10], Hajjem[11], Eysenbach[12], Norris[13].

...is always imperative that research output should have greater ...ach both within and across borders and to increase the ...ectiveness of research output need is same should get noticed ...the maximum number of people from the concerned field. ...eviously, publishing of research results in lesser known journals ...ed to be equally a problem as the people from related field used ...find it difficult to cite those research results. Now since the ...en access has broken this barrier from all sides as such has ...ximized the citation of even lesser known journals, even it ...n't be inappropriate to say that lesser known open access ...urnals have far greater reach and impact than reputed but ...osely published ones. Some of the good works done in the field ...f open access publishing in India include Arunachalam[14], ...hu[15] wherein the researchers have advocated of need for ...search institution and other organization to get involved in the ...A publishing at larger level. In India various national institutes ...s switched over to open access publishing these include, ...dian Academy of Science, Indian National Science Academy, ...edIndia, Medknow etc. apart from this most of institutions have ...veloped their individual institutional repositories which make ...e content available to users free of cost. Mukherjee[16] in their ...udy on open access reveals that in india about 155 different ...blishers publish more than 307 journals in open access format. ...edknow publications leading the OA publishing tally with 77 ...urnals, followed by AIRCC with 19, NISCAIR 15, Bio-Info 13 ...d so on. The other studies conducted in the open access arena ...Indian context include Sawant (2009) who studies more than ...5 OA journals of India hosted with DOAJ and O-Jgate. ...milarly OA publishing studies were conducted on individual ...bjects like medicine, LIS, Economics etc by Sahu[17], ...ukherjee[18] and Sahu[19] respectively.

...ost of the aforesaid studies and those not covered highlight one ...mmon aspect in them that open access publishing has helped ...crease the visibility of research output. Seekers of information, ...o were previously deprived of valuable information published ...closed formats for not having access to research output for ...urnals being costly or due to some other barriers has been ...ercome with OA publishing. Even the publishing in the open ...cess format has helped budding scholars to publish their research results in better and quicker form with wider viewership.

NEED, PURPOSE & IMPORATNCE

Open access publishing has shown tremendous amount of growth and acceptance among learned community during the last decade. Most of the countries all across the world have started publishing their research results in open access format and so has grown the concept of publishing and accessing information in open access format in India. The present study has been undertaken with the view to see and assess the growth of open access publishing in India during the last decade. Technology enabled society has largely shown interest in switching over to open access publishing from closed format.

Shrinking library budgets have already led the developing countries to a situation of serial crisis and since India being at the developing stage like rest of the developing countries including developed ones have started relying heavily on OA publishing. Closed format publishing especially journals of repute, prices of which used to escalate like anything and under the prevailing budget crisis, OA publishing proved a great boon to both libraries and the seekers of information. The present study will help us to develop a better idea about the need importance and purpose of OA publishing, which in turn is the basis of need, importance and purpose of undertaking the present study. The present study will also help us develop a better understanding about the future of OA publishing in India keeping in view the growth and growing trend towards OA publishing when compared with outside world or at global level

OBJECTIVES

- To assess the growing trend towards the open access publishing in India.
- To project India's growth on open access scholarly publications
- To measure the impact of OA journals published from India
- To assess the contribution of India in open access publishing at global and continental level.

SCOPE

The scope of the present study is limited to journals listed on Directory of Open Access Journals (DOAJ) from 2002 to 2012 by 121 countries of the world involved with open access publishing.

METHODOLOGY

Directory of open access journals database has been used to carry out the present study, which on the date of data acquired listed 8518 journals hosted by it on its website form 121 counties of the world. Statistical figures uploaded at the website of said directory accessible at (www.doaj.org) has been used for the analysis and evaluation of data. Statistical data acquired was put to excel format for better analysis and understanding mostly in consonance to our desired objectives set for the study.

DATA ANALYSIS, DISCUSSION & RESULTS

To execute the common operation like, addition, subtraction, drawings, percentage etc the data analysis has been undertaken mostly by putting data in the excel format. Point percentage has been taken up to two decimal points during the entire analysis.

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❑ Cumulative Growth of Journals from 2002-2012 at Global and Indian Level

Table 1: Cumulative Growth of Open Access Journals

Level	Journals in DOAJ (Yearwise)										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Global (%age increase)	34 (00)	552 (1523.52)	1098 (98.91)	1661 (51.27)	2142 (28.98)	2679 (25.07)	3515 (31.20)	4272 (21.53)	5729 (34.10)	7264 (26.79)	8518 (17.26)
India (%age increase)	0 (00)	14 (1400)	31 (121.42)	45 (45.16)	61 (35.55)	78 (27.86)	100 (28.20)	148 (48)	275 (85.81)	368 (33.81)	463 (25.81)

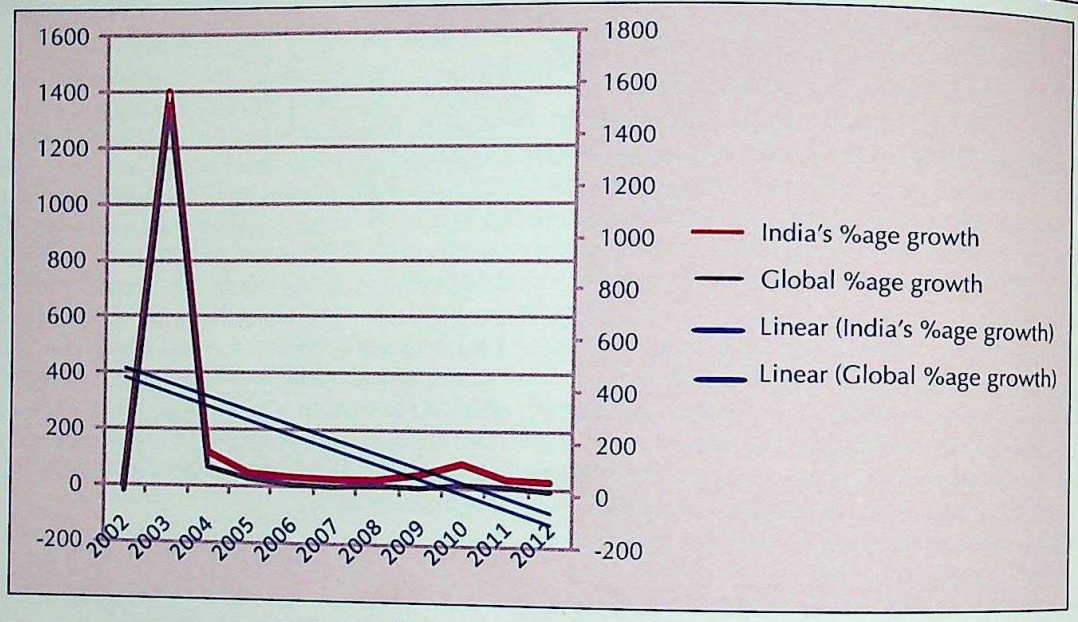

Fig. 1: Cumulative Growth of Open Access Journals

If we have a closer look at the tabulated figures and the graphical presentation of the growth of open access journals both at global level and in India we can see the figures as and graphical presentation almost go hand in hand. The trend line drawn at the graphical presentation shows clearly that growth of OA journals in India go parallel to that of growth of journals at global level. If we see from the figures on average the annual growth of OA journals at global level remained at 185.86% and for same peri the growth of OA journals in India remained at 185.16% almo mirror image of each other. If we have a look at the growth journals during an individual year we can see OA journals India grew parallel to OA journals at global level during the ye 2003, 2004 with almost equal growth and so stands true duri the rest of years with some marginal variation except for the ye 2010 were India shows better growth over global growth rate.

❑ Year wise Added Open Access Journals at Global and Indian Level

Table 2: Year wise Added Journals from 2002-2012

Level	Journals in DOAJ (Yearwise)										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Global (%age increase)	34 (00)	518 (1423.52)	546 (5.40)	563 (3.11)	481 (-14.56)	537 (11.64)	836 (55.67)	757 (-9.44)	1457 (92.47)	1535 (5.35)	1254 (-18.3
India (%age increase)	0 (00)	14 (1400)	17 (21.42)	14 (-17.64)	16 (14.28)	17 (6.25)	22 (29.41)	48 (118.18)	127 (164.58)	93 (-26.77)	95 (2.15

In order to have better understanding of growth of OA Journals both in India and at global level it was imperative to reflect the growth of newly introduced OA journals during each year from the year 2002 to 2012. In this tabulation percentage figures have been drawn in comparison to figures of corresponding year and increase or decrease in figures thereof has been recorded in to percentage. From the above tabulation we can see that dur each year growth of OA journals in India moved neck to nec with that of growth in newly introduced OA journals at glob level. At global level during the year 2006, 2009, and 2012 growth remained negative which when compared to India growth was recorded in reverse during the years 2005, and 2

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...for the rest of the decade India showed positive growth in ...ly introduced OA journals. When we have a look at the ...all average growth of newly introduced OA journals at global ...el we can see the journals grew annually @ 155.46% which is quite less when compared to growth of newly introduced OA journals in Indian on annual basis which grew @ 171.18% annually.

Year wise India's Contribution to Growth of OAJ at Global Level

Table 3: India's Contribution to Growth of Journals

Level	Journals in DOAJ (Yearwise)										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Global	34	518	546	563	481	537	836	757	1457	1535	1254
India's Contribution (%age)	0 (0)	14 (2.70)	17 (3.11)	14 (2.48)	16 (3.32)	17 (3.16)	22 (2.63)	48 (6.34)	127 (8.71)	93 (6.05)	95 (7.57)

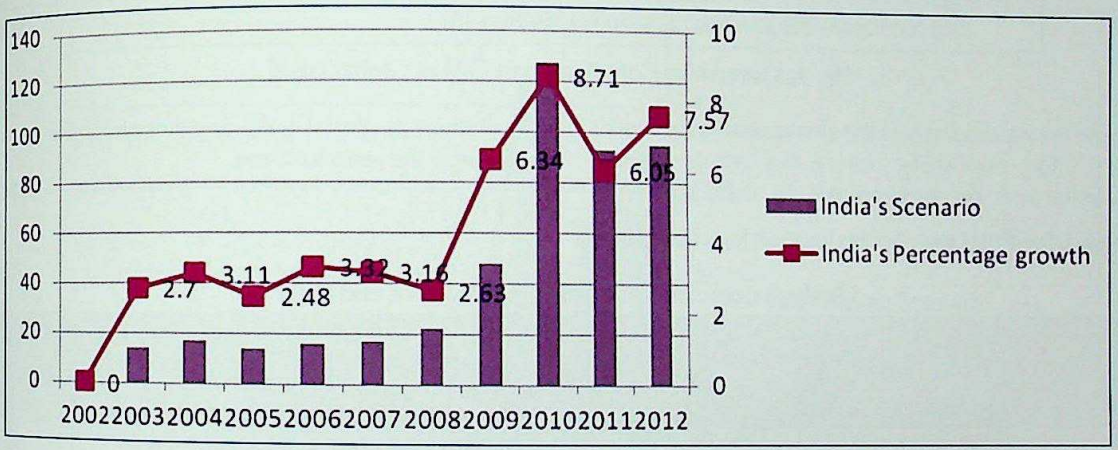

Fig. 2: Year wise India's Contribution to Growth of Journals

In the above tabulation attempt was made to assess the India's contribution of newly introduced open access journals at global level. From the tabulated figures and the graphical representation made, we can see there has been almost steady growth of newly introduced OA journals on annual basis both in India and at global level as well. In the table-I and II above we have seen the growth of India remained parallel to that of growth at global level. Still more if we see on annual basis India contributed 8.71% journals during the year 2010, followed by 7.57% in 2012 and 6.36% in 2009. The figures of contribution percentage are quite encouraging especially when taken from the view that the contribution of India has maximized towards the fourth quarter of the decade. Even during the year 2011 India contributed 6.05% journals, which is in tandem with figures reflected during other years. During the rest of the years of the decade the growth remained on average at 3% still more the encouraging part of it is that growth showed slight but steady increase year after year.

Cumulative Contribution of India to OAJ Publishing at Global level

Table 4: Cumulative Contribution to OAJ at Global Level

Level	Journals in DOAJ (Yearwise)										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Global	34	552	1098	1661	2142	2679	3515	4272	5729	7264	8518
India's Contribution (%age)	0 (0)	14 (2.53)	31 (2.82)	45 (2.70)	61 (2.84)	78 (2.91)	100 (2.84)	148 (3.46)	275 (4.80)	368 (5.06)	463 (5.43)

Above tabulation was drawn with the view to have better understanding about the overall India's contribution to OA publishing at global level. In this table and through graphical representation we have tried to highlight the contribution of India year to year basis. On the date of retrieving data from the DOAJ directory, the directory overall had 8518 journals listed on its website from 121 countries all across the world and India contribution as on day remained at 5.43% which is fourth largest contributor to OA publishing in world with 463 journals after United Kingdom with 575 journals and the largest contributor

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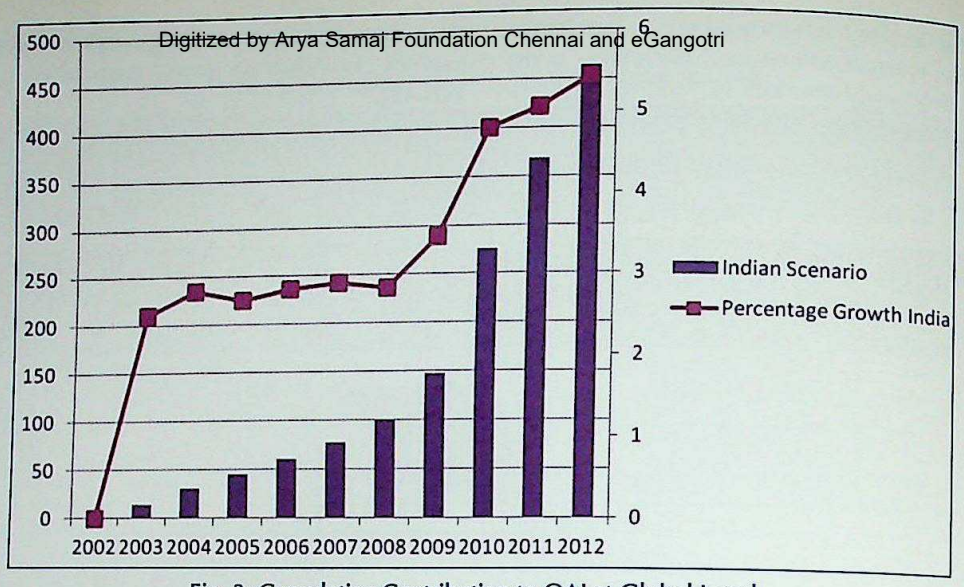

Fig. 3: Cumulative Contribution to OAJ at Global Level

from Asia. From the annual analysis it is also apparent that India's contribution to OA publishing during the whole decade remained steady and do showed steady increase in its contribution at global level and hopefully this trend will keep continue in the years to come.

❒ **Cumulative Growth of Open Access Journals in Asia and India**

Table 5: Cumulative Growth of OAJ in Asia and India

Continent / Country	Year wise Cumulative Growth										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Asia	2	58	139	227	275	336	432	570	885	1202	1477
India (%age)	0 (0)	14 (24.13)	31 (22.30)	45 (19.82)	61 (22.18)	78 (23.21)	100 (23.14)	148 (25.96)	275 (31.07)	368 (30.61)	463 (31.34)

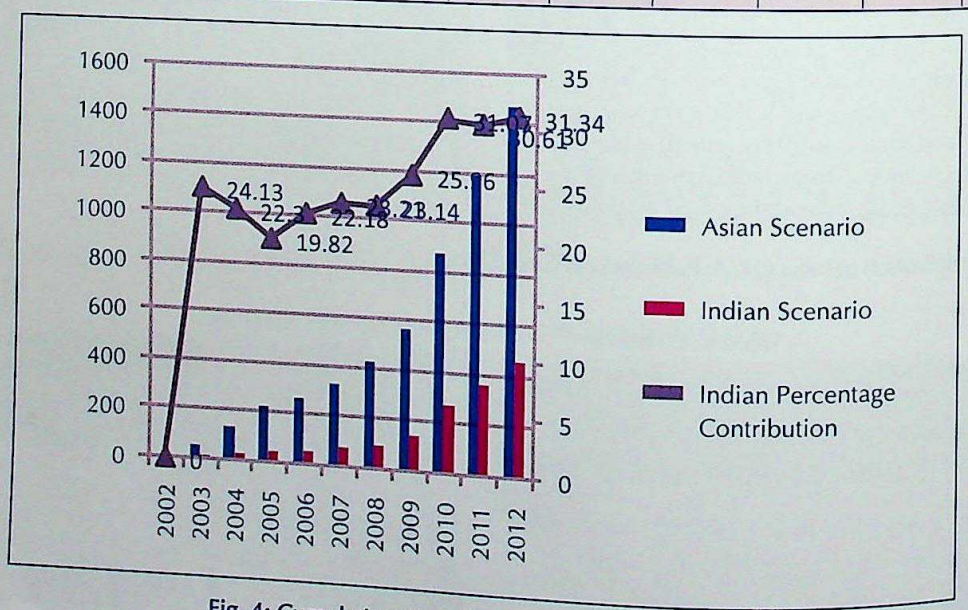

Fig. 4: Cumulative Growth of OAJ in Asia and India

At the continental level we can see Asia is the third largest continent which contributes to OA publishing with 1477 journals after North America which publishes 1749 journals in open access format and hosted on DOAJ directory. Above tabulation and graphical representation has been made to give a clear understanding about the contribution of India in OA publishing at continental level viz. Asia. India with its 463 journals contributes 31.34% of OA journals at continental level. After 2007 India remained the top contributor to open access publishing from Asia which otherwise was dominated by Japan till 2006. From the

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...ntage point of view India almost showed steady growth throughout the decade and more than 30% during the last ...g the whole decade which ran above 20% during the first quarter.

Year wise Added Open Access Journals from 2002-2012 in Asia and India

Table 6: Year wise Added OAJ from 2002-2012 in Asia and India

Level	Year wise Contribution of OAJ										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Asia	2	56	81	88	48	61	96	138	315	317	275
India	0 (0)	14 (25)	17 (20.98)	14 (15.90)	16 (33.33)	17 (27.86)	22 (22.91)	48 (34.78)	127 (40.31)	93 (29.33)	95 (34.54)

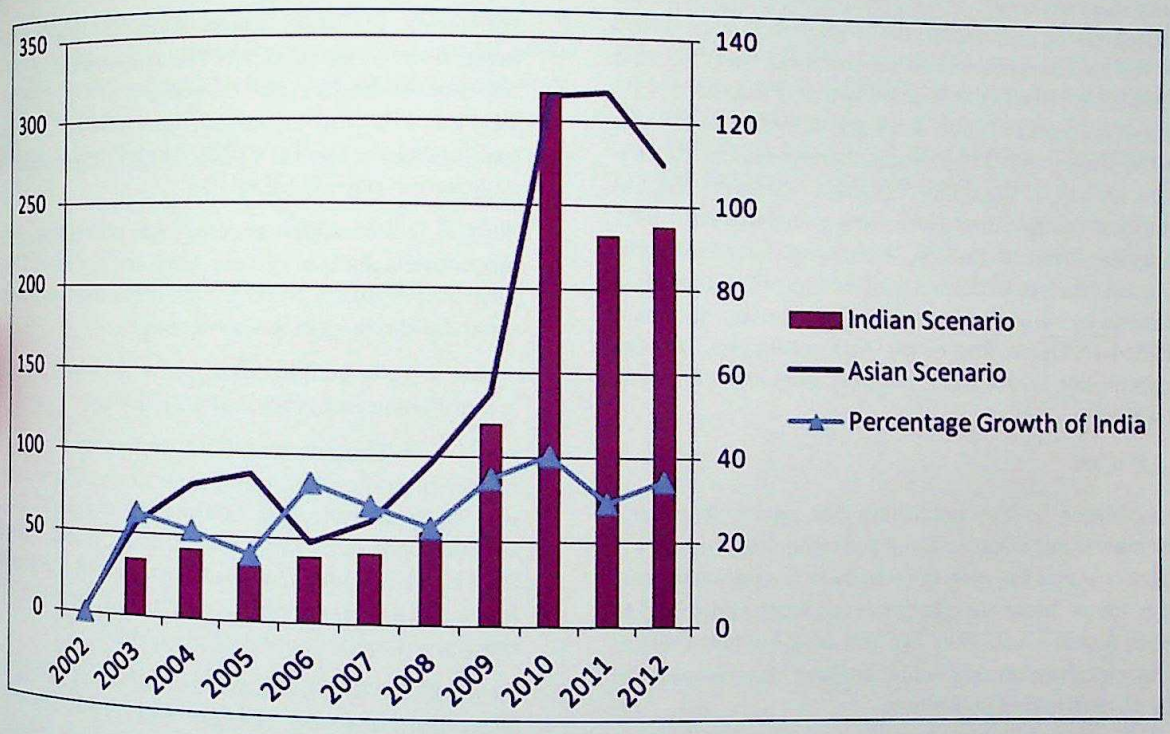

Fig. 5: Year wise Added OAJ from 2002-2012 at Asia and India

...ve tabulation was drawn with the view to assess the growth of ...y introduced OA journals on yearly basis in Asia, ...ordingly comparison was drawn with number of OA journals ...duced in India. From tabulated figures we can see that India ...s been the major contributor of OA journals at Asian level, ...ough Japan dominated during the first quarter of the decade and ...eafter there has been steady decline in the introduction of ...rnals and the momentum was taken over by India which for ...rest of decade dominated in introducing maximum number of ...journals. During the year 2005 India contributed more than ...journals and for the years 2003, 2004, 2007, 2008 and 2011 ...th remained between 20 to 30 percent. Growth of newly ...duced OA journals recorded for India remained more than ...for rest of the period, except during 2010, when it crossed ...mark.

Asia's Top Ten Open Access Journals Publishing Countries

Table 7: Asia's Top Ten Open Access Contributor's

Country	Journals	%age Contribution (Global)	%age Contribution (Continental)
India	463	5.43	31.34
Turkey	210	2.46	14.21
Iran	166	1.94	11.23
Japan	106	1.24	7.17
Pakistan	99	1.16	6.70
Malaysia	70	0.82	4.73
Russia	59	0.69	3.99
Indonesia	44	0.51	2.97
Korea, South	44	0.51	2.97
China	36	0.42	2.43
Rest of Asia	180	2.11	12.18
Total	1477	17.33	100

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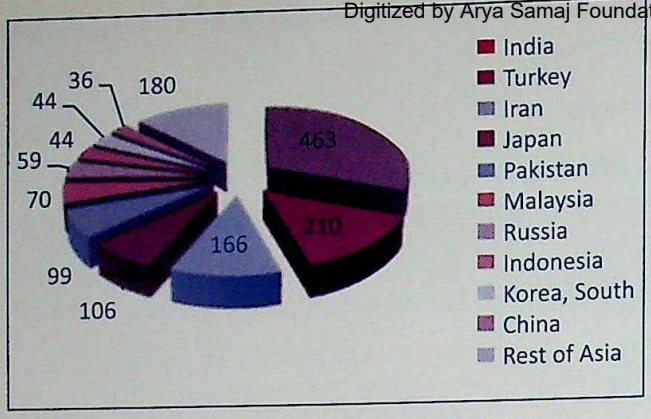

Fig. 6: Asia's Top Ten Open Access Contributors

From the pie diagram drawn and the tabulation, we get the clear grasping about the top contributors of OA journals from continent Asia. From the said analysis we can see that India leads the table with its contribution of 463 OA journals which constitutes 5.43% share at global level and 31.34% share at continental level. India is followed by Turkey with 210 journals, thereby making it 2.46% global share and 14.21% continental share. Iran with 166 OA journals stands at number three slot having global share of 1.94% and continental share of 11.23%. Accordingly the hierarchal structure which emerges for top ten contributors of OA journals in Asia is followed by Japan, Pakistan, Malaysia, Russia, Indonesia, Korea South, and China. Rest of the Asia contributes 180 OA Journals constituting 2.11% share at global level and 12.18% at continental level.

CONCLUSION

India's contribution to OA publishing has grown leaps and bounds during the last decade, and if the trend continues in the same fashion towards the next decade there is every likeliness that in near future India may become top contributor of OA publishing at global level. Also like rest of the world there is growing consciousness among Indian intellect class towards the importance of open access publishing.

From the above analysis, we can say the concept of open access publishing has grown to a large extent in India. India as a country is largest contributor of open access publishing in Asia and 4th largest in the world. At the global level concept of open access publishing has received equally greater importance and one can see that OA Journals have almost grown at constant level during the last decade. Except for the year 2005 and 2011 India has almost shown steady growth in the newly introduced OA Journals. In terms of average percentage growth of OA Journals India supersedes in global average percentage growth of OA journals.

Realizing the need and importance of open access publishing most of research organization, academic intuitions or even Govt. institutions in India have started publishing their research results in open access format. Of the late, a good number of closed format journals have switched over to OA publishing module and make scholarly content available to public free of cost in open access format. Some of the previously closed access journals have also initiated process towards making available the back issues of the journal to public by adapting to digitization techniques and creating its archives. Acceptance of OA publishing module all across the globe has opened up new vistas for publishing research results and has also helped to increase the visibility of research output and ultimately its application by the end users. In the coming days the trend may grow to a larger proportion and we may reach to a stage whereby all closed format publishing may turn open, as OA format has already posed challenge to the survival and sustenance of closed format publishing.

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Authorship Patterns and Collaborative Research Trends in the Field of Chemical Sciences

Vishal Goyal*, Girish Kumar Gupta** and Ashok Kumar***

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*Library Assistant
**Lecturer
MM College of Pharmacy
MM University
Mullana- Ambala
***Librarian
MMIMSR
MM University
Mullana- Ambala

Corresponding Author
Vishal Goyal
vishalgoel99@rediffmail.com

ABSTRACT

Authorship trends and collaborative research are studied in the field of Chemical Sciences based on the data collected from Indian Journal of Chemistry Section-B (IJC-B) published during the 2002-2011. Outcome of the study shows that multi authored articles 97.24% prevail the single authored articles 2.75%. The degree of collaboration in the field of chemical sciences is 0.97. Average number of authors per paper varies from 3.21-3.78. This study is in support for the fact that chemical sciences research is collaborative in all aspects.

KeyTerms: Authorship Pattern, Collaborative Research, Chemical Sciences, Publication Trends.

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INTRODUCTION

The meaning of collaborative research is termed as collaboration research by definition is termed as "mutual participation researchers in a coordinated effort to sort out the solution of a problem together." Collaborative interactions are characterized by shared goals, symmetry of structure, and a high degree of negotiation, interactivity, and interdependence, Lai[1]. Authorship pattern and productivity are the important parameters in order to study citation analysis. Generally authorship of the article or document as become important for scientists and researchers in order to make out the author productivity and authorship pattern, the analysis of nature of research collaboration in research activity is prime factor. In the present paper, collaboration research trends in the field of chemical sciences as reflected through the Indian Journal of Chemistry -B are studied in period of 2002-2011. Our main focuses in present communication is 'To study trends in field of chemical sciences, single versus multi authored articles, measure the degree of collaboration in the area of chemical research'.

METHODOLOGY

As avowed previous the Indian Journal of Chemistry is used as source journal for data collection. IJC-B is published monthly. It is a leading monthly journal in the field of Organic and Medicinal Chemistry which started publishing since 1976. It contains review articles, applied research articles, scientific reports and short communications etc. on chemical sciences and research 10 volumes (vol. 41B to 50B) containing 120 issues of IJC section B published during the session 2002-2011 have been taken into account for the study. Each published article has been analyzed to record the details of the title, author and no. of authors. The data collection was done manually and promote for tabulation year wise[2].

RESULTS AND DISCUSSIONS

A large number of studies have been done in the last few decade by library professionals Kalyane[3], Subramanyam[4], Chandra[5], Vinther[6], Arora[7], Joshi[8], Farhat[9], Bandyopadhyay[10], Vimala[11], Vijay[12], Kannappanavar[13], Amsaveni[14] and Sugimoto[15]. The total number of articles in 10 years is 2102 which consists of research work carried by various research scientists, Academician and scholars during these years.

❑ Year-wise Distribution of Articles

The details of the no. of articles during 2002-2011 are presented in table 1. It was found that the highest no. of articles were published in year 2006 i.e. is 280 or 13.32% of the total articles whereas lowest no. of articles were published in year 2011 i.e. 117 or 5.56% of the total articles.

❑ Authorship Pattern

The data revealed that there are 58 single authored articles, 5

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...les having two authors and 638 articles collaborated by three authors. The no. of articles having four or more than four authors ...22. These data clearly demonstrates that researchers prefer to ...work in collaboration. There are 2044 papers which were ...ten by two or more authors where as only 58 articles belong to ...le category. The ratio of collaboration work was found to be ...y high than the single author working i.e. the ratio between ...m work and solo author work is about 58:1.

Table 1: Year-wise Distribution of Articles

Year	Articles/ 1 Author	Articles/ 2 Authors	Articles/ 3 Authors	Articles/ more than 3 Authors	Total
002	12	72	83	94	261
003	14	83	78	97	272
004	05	73	84	90	252
005	07	84	67	113	271
006	10	92	78	100	280
007	03	48	62	70	183
008	03	44	53	56	156
009	04	35	50	68	157
010	00	36	44	73	153
011	00	17	39	61	117
Grand Total (%)	58 (3%)	584 (28%)	638 (30%)	822 (39%)	2102 (100%)

...ble I represented the productivity pattern of authors. It was found ...t 58 authors preferred to work solely which is only 3% i.e. lowest ...centage of the total work, when percentage of single authorship ...s compared with the percentage of multiple authorship. Only 58 ...thors prefer to work as single author. Two authors constituted ...% with 584 papers. Three authors constituted 30% with 638 ...papers. 822 papers contributed by more than three authors get 39% ...hich is the highest percentage of total work. The data clearly ...dicted that the domination of multiple authorship trend over ...gle authorship trend. The study of publication trends and ...thorship pattern is being a pertinent area of knowledge ...peration of library sciences and related professionals.

Single Authorship vs Multiple Authorship in Chemical ...iences

Table 2: Single Authorship vs Multiple Authorship

Year	Single Author		Multiple Authors		Total Papers
	Papers	%age	Papers	%age	
2002	12	4.59	249	95.40	261
2003	14	5.14	258	94.85	272
2004	05	1.98	247	98.01	252
2005	07	2.58	264	97.41	271
2006	10	3.57	270	96.43	280
2007	03	1.63	180	98.36	183
2008	03	1.92	153	98.07	156
2009	04	2.54	153	97.45	157
2010	0	0	153	100	153
2011	0	0	117	100	117
Grand Total	58	2.75	2044	97.25	2102

...single authored papers denoted by NSA and no. of multi authored papers denoted by the term NMA. Each year shows that multi authorship predominant over single authorship. NMA and NSA values are calculated for each year and it was found that highest percentage of NMA articles is 100 in the year 2010 and 2011 and lowest percentage is 94.85 in 2003. In 2010 and 2011 none of the article was published by single author. Over all NSA paper constituted only 2.75% whereas NMA papers constituted 97.24% figure 1 showed comparison of percentage of single authored papers and multi authored papers.

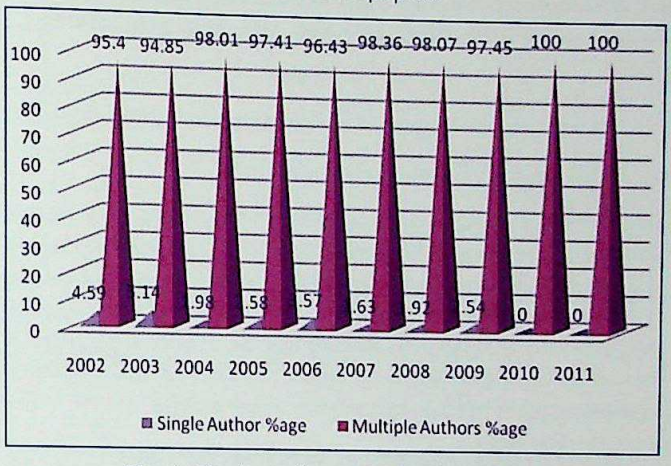

Fig. 1: Single Author vs Multiple Authors

Degree of Collaboration in Researchers

The degree of collaboration can be calculated by the formula given below:

Degree of Collaboration (C) = No. of Multiple Authors (NMA)/ {No. of Multiple Authors (NMA) + No. of Single Authors (NSA)}

By using this formula the degree of collaboration in the area of chemical sciences has been calculated and provided in table 3. The degree of collaboration was calculated for 10 years. It showed that the degree of collaboration is 0.95 in 2002 and more or less this value is maintained throughout the period taken. In 2003, it is seen that it is decreasing to 0.94 but in 2010 & 2011 it increases up to 1. Rest of the year also showed trend towards multi authorship. Average degree of collaboration which is 0.97 shows researchers preferred team work in research. The result revealed that the degree of collaboration in chemical sciences is more than that of other sciences as compared to work solely. Figure 2, represents the degree of collaboration during 2002-2011.

Table 3: Degree of collaboration in IJC-B

Year	NSA	NMA	Degree of Collaboration C=NMA/(NMA + NSA)
2002	12	249	0.95
2003	14	258	0.94
2004	05	247	0.98
2005	07	264	0.97
2006	10	270	0.96
2007	03	180	0.98
2008	03	153	0.98
2009	04	153	0.97
2010	00	153	01
2011	00	117	01
Grand Total	58	2044	0.97

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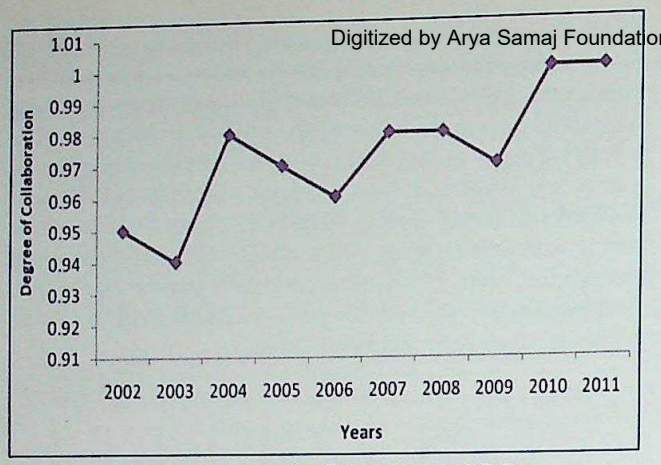

Fig. 2: Degree of collaboration in IJC-B

❑ Average No. of Authors per Article in IJC-B

Average no. of Articles was calculated in table 4 and it is seen that the average no. of authors per article varies from 3.21 in 2002 to 3.78 in 2011. Highest average authorship is observed in 2011 i.e. 3.78 whereas lowest average authorship in 2003 which is 3.19. In 10 years from 2002 to 2011 the average no. of authors per paper is found to be more than 3. Figure 3 showed the graphical representation of average no. of authors per articles.

Table 4: Average No. of Authors per Paper

Year	Total Papers (P)	Total Authors (A)	Average no. of Authors per Paper AAP=A/P
2002	261	839	3.21
2003	272	870	3.19
2004	252	829	3.27
2005	271	908	3.35
2006	280	918	3.27
2007	183	623	3.40
2008	156	529	3.39
2009	157	554	3.52
2010	153	531	3.47
2011	117	443	3.78

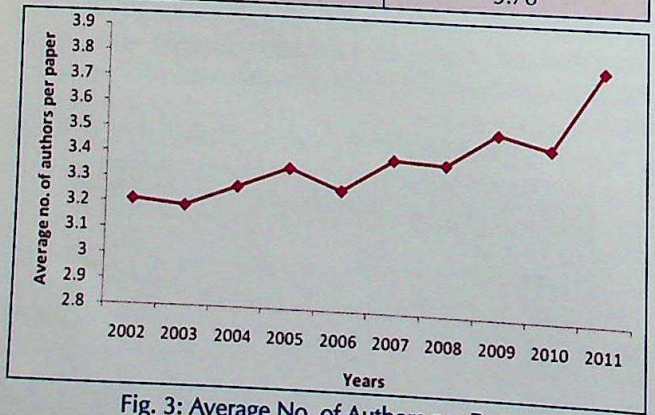

Fig. 3: Average No. of Authors per Paper

CONCLUSION

The tendency in the direction of collaborative research is seen steady during 2002-2011 in the field of Chemical Sciences. Outcome of study clearly show that authorship trend is moving on the way to multiple authorship and degree of collaboration found to be high. However, multi authorship pattern is found high flying in the field of Chemical Sciences. Present study supports the fact that collaborative research in various fields of technical sciences has become more worthy and prefer to work together in an objective like a team.

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Use of Wiki by Students of Sociology and LIS Departments of University of Pune: A Comparative Study

Sadanand Y. Bansode

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Associate Professor, DLIS
University of Pune, Pune.

Corresponding Author
Sadanand Y. Bansode
sadanand@unipune.ac.in

ABSTRACT

The paper attempts to compare the use of Wikipedia among students of Department of Library and Information Science(DLIS) and the students of Department of Sociology from University of Pune. It has been found that the library science students are more literate in the use of Wikipedia as compared to the students of sociology, the reason might be Wikipedia is a part of curricula of library science students. Also the fact that Wikipedia is editable, hence the students of library science are more cautious before using the information available on Wikipedia.

KeyTerms: Wikipedia, Web 2.0, Sociology, LIS, RSS, Blogs.

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INTRODUCTION

The introduction of web 2.0 has revolutionized the world. It has changed the aspect in which the scholarly communication of information used to take place. The components of web 2.0 such as Weblogs, RSS, Wikis, Social Networking, Mashups and many more are used by the users for carrying out many applications. Students involved in classroom learning process are mostly dependent on the classroom teaching and lecture notes. Apart from these sources the students are also using components of web 2.0 such as RSS, Wiki, Blogs etc. into the learning process, Bakaria[13]. Among components of web 2.0 many institutions have developed wikis for promoting the learning contents and also to cultivate collaborative learning among the students.

Ward Cunningham coined the term wiki in 1995 when he started his website using the software wikiwikiweb developed by himself. Since then many wiki tools have been developed and used in variety of knowledge sharing projects, Harris[5]. Wikipedia was launched in 2001 by Jimmy Wales and Larry Sanger, using the concept and technology of a Wiki as a free encyclopedia that anyone can edit and currently contains more than 4,264,436 articles in 285 languages. Wikipedia is the world's seventh-most-popular website, visited monthly by around 11% of all internet users, Wikipedia[12].

REVIEW OF LITERATURE

Almeda[7] conducted a study in an undergraduate, 1st year education course regarding the implementation of wikis as part of course assignments. 74% students reported initially they were worried at learning a new technology, their overall experience using the wikis was positive. Canole[1] concluded from undergraduate student responses on surveys that through Web 2.0 applications such as wikis students developed new forms of evaluation skills that enabled them to critique and make decisions regarding new content. Students look it see it as just another tool to support their learning. Carpenter[2] reported that the majority of graduate education students in their online courses indicated that wikis facilitated group learning. Harris[4] concluded that wikis aided in student learning as reported by those enrolled in an online health information education course. Coutinho[3] reported similar results in their study of graduate Educational Technology courses. Choy[9] experimented with wiki software for supplementing online learning and concluded that wikis have the potential to support and structure communities where individuals came together to share, learn, create and collaborate with each other. Minocha[6] has described the wikis-based collaborative activities and the evaluation of the pedagogical effectiveness of a wiki for collaborative learning.

A lot of educators categorically refuse any citation coming from Wikipedia, warning students to stay as far away as possible from that source, including numerous K12 institutions and Lehigh University, University of Delaware[11] whereas some views it as a starting point to get themselves introduced to the new concept and also a source pointing them to different other sources, Shareski[8].

Others see wiki as a site which provides a starting point to introduce the concept of the value of information, and set their student to check the facts on other sources.

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CHARACTERISTICS OF WIKI

Tonkin[10] has categorized the use of Wiki into following four broad categories:

- Single User: Individual user can develop his own thought and can edit his own thoughts, which is useful for revision and monitoring changes.
- Lab Book: This enables students to peer review notes kept online by adding, for example, commentary or annotations to existing lecture notes or seminar discussions.
- Collaborative Writing: A group of users can use this for writing a paper, research project or any assignment collaboratively.
- Knowledge Base: Wiki supported by an advanced search functionality so that the data can be access rapidly and accurately.

UNIVERSITY OF PUNE

University of Pune is one of the primer institutions in India established in 1948. Presently it has 53 Academic Departments on the campus catering education in the field of Science, Social Science, Arts, Humanities, Engineering, Medical etc. and more than 900 colleges and institutions affiliated to the university. All the departments on the university campus are well connected with a network and sufficient nodes for accessing internet has been provided in the department, apart from this the university library has an internet facility centre which can accommodate more than 50 students at a time. Students who do not have internet facility at their department, use the facility available at the internet centre of the central library. Students access internet and also the databases subscribed by the library for its users.

OBJECTIVES

Following objectives were set for the study.

- To test the awareness of the students towards Wikipedia.
- To find the purpose for which they are using Wikipedia.
- To find out the dependency of the students for information on Wikipedia.
- To make comparison between the students from Sociology and Library Science.
- To know students from which department are well versed with Wikipedia.

METHODOLOGY AND SCOPE

The scope of the study is limited to two social science department viz. students from the LIS and Sociology. The study comprises of all the students admitted for the first year and second year for both the courses. Total 120 questionnaires were distributed to the students of Sociology and 60 questionnaires to the students of DLIS, accordingly 115(95.83%) students from the Sociology and 60(100%) students from the DLIS gave their feedback, these 175 respondents became the sample for final analysis of the study. The further analysis is based on the feedback given by these 175 students.

DATA ANALYSIS

❑ Use of Web 2.0 Components

The present generation is more dependant on the resources available on the web. Many form of information resources are available on the web, hence the question was asked whether the students are using the components of web 2.0 and it is found that all the students are using the components of web 2.0.

❑ Use of Wikipedia

In connection to the above question it was asked whether the students are using Wikipedia and if they are using it then for what purpose they are using. All the 175 students stated that they are using Wikipedia, and as far as their usage is concerned it is shown in the following table 1:

Table 1: Purpose of Use of Wikipedia

Purpose	Students		
	Sociology	LIS	Total
Information about a known concept	47(40.87%)	04(6.67%)	51(29.14%
Information about unknown concept	23(20%)	42(70%)	65(37.14%
To know meaning of the term	19(16.52%)	-	19(10.86%
Information about a known concept + Information about unknown concept	26(22.61%)	14(23.33%)	40(22.86%
Total	**115(100%)**	**60(100%)**	**175(100%)**

From the above table 1 it is clear that the purpose of using Wikipedia differs from the students of sociology department and library science department. Out of the total 115 respondents 51(29.14%) students use Wikipedia to retrieve information about the known concept, of which 47(40.87%) are from the sociology department and 4(6.67%) are from library science department followed by 65(37.14%) students using Wikipedia for obtaining the information about the unfamiliar concept, out of these 23(20%) and 42(70%) students are from sociology and library science department respectively, where as 40(22.86%) students use Wikipedia for obtaining information about the known as well as about the unfamiliar concept, of which 26(22.61%) and 14(23.33%) students are from sociology and library science department and 19(16.52%) students from the sociology department use Wikipedia for retrieving meaning of the term.

Actually Wikipedia consists of articles on the concepts written and edited by any person who is interested in the subject or who is having sufficient knowledge about the subject. When it comes to the consultation of some information from Wikipedia, it is always wiser to consult it for such a concept which is not known or for which one is unfamiliar. From the above analysis it is clear that very few students from sociology department use Wikipedia to retrieve information about the concept which is unfamiliar to them, where as majority of the students from library science department consult Wikipedia when they come across the concept which is unfamiliar to them.

❑ Features of Wikipedia

As it was found that the students are using Wikipedia for one of the other purpose, it was assumed that the respondents from both the departments are well versed with the features of Wikipedia, hence question was asked that according to them which are the feature of Wikipedia which attract them or users and the

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sponses received from the respondents has been tabulated in following table 2:

Table 2: Features of Wikipedia

Features	Students		
	Sociology	LIS	Total
sy to search	15(13.04%)	-	15(8.57%)
Collaborative	11(9.57%)	-	11(6.29%)
Online	23(20%)	-	23(13.14%)
Editable	25(21.74%)	-	25(14.29%)
st of References used	11(9.57%)	-	11(6.29%)
Hyperlink	09(7.83%)	-	09(5.14%)
sy to search + Online	-	01(1.67%)	01(0.57%)
sy to search + Online - Collaborative + st of references	07(6.08%)	-	07(4%)
sy to search + Online - Editable	05(4.34%)	17(28.33%)	22(12.57%)
sy to search + Online - Editable + List of erences used +Colla- orative + Hyperlink	09(7.83%)	42(70%)	51(29.14%)
Total	115(100%)	60(100%)	175(100%)

is clear from the table that out of total respondents, 51(29.14%) spondents are very well aware about the features of Wikipedia, t of these, 42(70%) respondents from Library science and only 7.83%) respondents from the sociology department are ving sufficient knowledge about the features of Wikipedia. early 94(81.73%) respondents from the sociology department ed various features which attract them, 15(13.04%) spondents stated that search is easy and these feature attracts ers, 11(9.57%) respondents stated that collaborative is the ature while 25(21.74%) stated editable, 11(9.57%) opined the t of references given at the end of the article and 9(7.83%) ined hyperlinks given in the article and 23(20%) stated online e the features which attracts them to Wikipedia, these finding eals that the students from sociology department are not fully are about all the features which attract the users.

is the students of the library science who opted for many atures of Wikipedia which attracts the users. The reason behind is can be that the Wikipedia is a part of their curricula and they e taught to evaluate the available information source, which ludes features and other aspect of information source; also the dents are well aware of the importance of references used in article and the importance of editing the outdated information keeping it more current.

Usefulness of Wikipedia

e students were asked how the Wikipedia fit to their study or at stage of their assignment/study or research the Wikipedia is e useful to them. The options provided to the respondents e at the beginning of the study, towards the middle of the dy, at the end of the study and at any stage of the study. The sponses received from the respondents has been tabulated in following table 3:

Table 3: Usefulness of Wikipedia

Particulars	Students		
	Sociology	LIS	Total
At the beginning	26(22.61%)	52(86.67%)	78(44.57%)
Towards the middle	23(20%)	-	23(13.14%)
At the end	09(7.83%)	-	09(5.14%)
At any stage	57(49.56%)	08(13.33%)	65(37.15%)
Total	115(100%)	60(100%)	175(100%)

Out of the total respondents, 52(86.67%) from library science department and 26(22.61%) respondents from sociology department felt that Wikipedia fits at the beginning of their assignment/study or research, followed by 57(49.56%) from sociology department and 8(13.33%) from library science feel that Wikipedia can be useful at any stage of their assignment, while 23(20%) respondents from sociology department stated that Wikipedia is more useful towards the middle of their assignment and 09(7.83%) respondents from sociology department felt that it is more useful to them at the end of their assignment/research.

The above finding clearly indicates the literacy level of respondents from both the departments. Library science students felt that whenever they came across some new concept of which they are not aware they consult Wikipedia i.e. at the beginning of the study and once they get familiar with the concept and get the sufficient references available in the article they go for more literature and hence felt that Wikipedia is more useful to them at the beginning of their assignment/ research. Students of sociology do feel that it is useful to them at any stage of their assignment and seems to be less bothered for getting towards the other references from books, journal articles etc.

❑ Cross Verification of Wiki Information with other Search Engines

The respondents were asked whether they were able to find suitable answers for the concept they were looking in Wikipedia and it was found that all the respondents do find suitable answers in Wikipedia. In connection to this question it was further asked that whether they have cross checked the information available in Wikipedia before the actual use and the responses received has been tabulated in the following table 4:

Table 4: Cross Verification of Wiki with other Search Engines

Cross Verification with other Search Engines	Students		
	Sociology	LIS	Total
Yes	17(14.78%)	60(100%)	77(44%)
No	98(85.22%)	--	98(56%)
Total	115(100%)	60(100%)	175(100%)

From the above table 4 it is obvious that total 77 respondents i.e. 17(14.78%) from sociology department and 60(100%) respondents from library science department cross check the information available on Wikipedia before its actual use, where as 98(85.22%) respondents from sociology department directly make the use of information available on Wikipedia for their assignment/ research etc.

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It can be inferred that out of the total population only 72 respondents know that Wikipedia is a component of web 2.0 and because of its editing characteristic any user may alter the available information, hence it is always wiser to cross verify the information. Because of its editing facility their can some information which may be uploaded by the person who has very little or no knowledge about the concept and the students may use the same information for their assignment or research.

❑ Accuracy and Updated Information on Wikipedia

Further opinion regarding the accuracy and updateness of information available on Wikipedia to the 77 students who cross check the information before actual use and the responses revealed that 54(70.13%) students found that the information available on Wikipedia is not updated properly where as 23(29.87%) students felt that the information available is accurate and updated.

❑ Opinion Regarding the Reliability of Wikipedia

Lastly open ended question was asked to the respondents about the reliability of Wikipedia and the answers reveal that almost all the respondents opined that, Wikipedia is a good source of information having result for the maximum terms they used for searching, where as 48(80%) students from the library science further elaborated that even though it is good source of information they cannot fully rely on the information content, because they don't get any idea about the author who has edited the information. It can be of more value if the Wikipedia highlights the name and designation of the person who has edited the information.

FINDINGS

The findings of the study have been highlighted as under:

- All the students from library science and sociology department are well aware of the various components of web 2.0 and are using it. Wiki and social networking sites are used by all the students.
- Purpose of using Wikipedia differs from the students of sociology department and library science department. Total 65(37.14%) students are using Wikipedia for obtaining the information about the unknown concept of which 23(20%) students are from sociology department and 42(70%) students from library science department. The finding clearly indicates that the library science students are less dependent on the literature available on Wikipedia as compared to the sociology department.
- The features of Wikipedia are well explored or known to the students of library science as compared to the students of sociology department. Actually easy search, online, editing, list of references collaboration, hyperlink are the features of Wikipedia which is known to 70% of the library science students and 7.83% students from sociology know about these features.
- It is found that 86.67% students from library science department found that the Wikipedia is more useful to them at the beginning of the study, while only 22.61% students from sociology department feel the same. 49.56% of the respondents from sociology department opines that Wikipedia is useful to them at any stage of the study while only 13.33% students from library science students opines the same.
- All the respondents from both the department find suitable answers for the concept they were looking at, but when it comes for cross verification of the information found on Wikipedia 100% students from library science department carries out this activity whereas only 14.78% students from sociology department do the cross verification.
- It is found that, out of 77 students who cross check the information before actual use 54(70.13%) students found that the information available on Wikipedia is not updated properly where as 23(29.87%) students felt that the information available is accurate and updated.
- 48(80%) students from the library science stated that even though Wikipedia is a good source of information but they cannot fully rely on the information content, because they don't get any idea about the author who has edited the information.

CONCLUSION

It is clear that web 2.0 is getting more popular among the users especially Wikipedia due to the information content in it. Students are more dependent on the Wikipedia for getting the information on the concept of which very little is known to them. Students from library science are more cautious towards the information which is retrieved from Wikipedia as compared to the students from sociology department, it is obvious because they are well aware with the fact that the information available on Wikipedia can be altered by any users, hence it is wiser to verify the information before use. Students of library science know much more aspects of Wikipedia as compared to students from sociology department due to the reason that, Wikipedia is a part of their curricula and is being taught in detail also the evaluation of information sources is the basic job of library science students. Because of all these aspects library science students are in better position to use the Wikipedia at the right time. Students from both the departments are using Wikipedia because it is a quick way for getting information on a related topic.

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Application of Total Quality Management in Academic Libraries

B.Sivakumar* and J. Dominic**

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*Research Scholar
Bharathirar University
Coimbatore

**Chief Librarian
Karunya University
Coimbatore

Corresponding Author
B.Sivakumar
bslib07@gmail.com

ABSTRACT

In the recent era it could be noted every organization strive to perform and excel in such a manner to withstand in the highly competitive world to please their customers. Library and Information Science is no exception to it and hence they also engage in the attempt to satisfy the stakeholders of all kinds seeking the learning resource centres. Almost majority of libraries across have begun to implement Total Quality Management Systems in their organizations and started to continuously improve their services to the customers. TQM is one of the most power tools which act as a management tool which methodically come into sight to offer outstanding quality products and services to stake holders. Due to dynamic changes in the field of Library and Information Services, academic libraries have been necessarily forced to learn the methods and materials of different formats to exhibit excellent performance to satisfy their customers through fulfillment of their needs of information. All the efforts in quality improvements and excellence in performance shall be successfully achieved with the help of highly competent library professional and other human assets involved in the process. The paper is an attempt to make the readers to understand the importance of TQM, an effective system that could enhance the performance of academic libraries with the aid of earlier research and literatures.

KeyTerms: TQM, Quality Assurance, TQM culture, Benefits of TQM, Customer Focus, TQM in Libraries, ISO 9000.

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INTRODUCTION

During the recent decades, Total Quality Management (TQM) had witnessed an extensive acceptance as a channel to gain and maintain the competitiveness in the global market place by most organizations of different nature. Globalization issues have prompted the move to ensure quality, and Higher Education Institutions (HEIs) have been propelled quickly to adopt quality models and standards with an intention to survive in the increasingly global market. Indeed, across the globe, HEIs have made unyielding progress in adopting quality models and institutional self-assessment approaches. In the United States, the Malcolm Baldrige National Quality Award (MBNQA), and in the United Kingdom, the European Foundation for Quality Management (EFQM) Excellence Model, have been adapted for the Higher Education sector and institutions within the sector are recognizing their benefits.

Due to the consequences of technological and scientific revolutions, the sheer quantity of knowledge and information is expanding exponentially and increasingly varied studies population are burgeoning, the quality of training for teachers and the quality of teaching in higher education institutions demands top priorities. Seymour admits that education, and particular, higher education itself, is also being driven towards commercial competition imposed by economic forces.

LIBRARY AND ITS CHANGING FACADES

Library and Information is not new as what we understood in our sense, but it was in existence from the ancient times and is as old as the origin of education in the olden days. The entire human civilization until these days had experienced three waves of social change, viz., the age of agriculture, the age of industrialization and the age of information. Throughout the world libraries that are most modern are 'hybrid' libraries characterized by print and electronic collections, manual and ICT (information and communication technology) based

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vices. It cannot rest up at this stage. It has to move beyond their traditional role and supposed to function as custodians of books or integrate new methods of storage and transmission of formation into an already existing structure. All these modern braries must link the users with the information they seek. It was served that the recent times users of library expect more from raries than ever before.

ence there is a necessity of the libraries turned to become mitted by offering high quality services to all its users. Most of during the earlier days thought that higher rate of resource sumptions, purchasing, stocking and storing of new books in institution premises is deemed to quality improvement cess. In the present situation the above approach doesn't hold enough as it is invalid. Today quality improvement in the rary and Information Service is to offer the needed information the users at the required and appropriate times. This could be ssible only through a total and comprehensive transformation the existing system to the modern ones by understanding the ecific user needs and the types of information required by them d to satisfy the stakeholders at the utmost level. In the recent rs it is strongly believed by most library professionals and ucational institutions, that Total Quality Management plementation could provide the desired goals of the keholders and as well as the organizational objectives. Due to ese reasons TQM is regarded as the most popular mechanism at could transform any organization in different spheres and ce becoming trendy among the modern libraries.

a corollary the level of expectation among the users started to crease manifold and thus forced libraries to confront higher el of changes. In turn they started to indulge in the attempt of provisation of the quality in its services.

the present context due to increasingly tight budgetary strictions, library managers are under high pressure to fully ploit available resources. Therefore, several libraries and formation services have adopted quality management practices recent years. Among the various initiatives implemented clude ISO 9000 standards Johannsen[15], 5S movement Taipei nicipal Library[32], and benchmarking Zairi & Hutton[35], rrod & Kinnell[12], Garrod & Kinnell[13], Buchanan & Marshall[5]. adopting quality management, the library's image and service ality can be improved, and librarians can increase productivity ile focusing on the customer's needs, Johannsen[17].

QUALITY ASSURANCE IN LIBRARY: EXERPTS

ora[3] has stated the library as the 'heart' of the academic setup. like Arora a similar view was expressed by Tayabas[33]. Both ese authors have mentioned in their work that the libraries play the centre of the stage in all the functional aspects of University: eaching, research and extended activities.

order to achieve the academic excellence and developments re is a strong urge for the quality improvements and dernization of libraries. The changes in higher education mpass global level is highly dynamic and hence libraries under e thrust and uncontrolled by various factors. This is due to hnological changes, revolutionary effects in information chnology, policies such as globalization, internationalization ocess and the global business in higher education. In nsequence libraries search the means to become highly competitive and is at a Gangotri center stage in managing and offering services through the library and information services. At this juncture most libraries have started to focus not only in offering quality service but begun their journey in the upfront side by adapting quality management systems.

Customers believe and encourage organizations who could strongly assure them with quality and timely services. Therefore, in the recent decades quality assurance becoming a strong mantra among every organizations to sustain in their operations and in their growth process. Quality Assurance is the systematic process through which the entire process could be monitored, evaluated during the course of offering products and services to the end users. Hence, quality assurance is well recognized at all levels in the organization. In effect to this recognition, organization has started to evolve suitable policies, attitudes, action plans and procedures that are essential for providing quality services as promised and that could raise the level of confidence among the stakeholders.

The most popular worldwide quality management systems and well recognized by most organizations at the global level is ISO 9000. It is a system that offers a promise to the end users that they will be offered with quality products and services confirming to the international standards. Based on the standards fixed by ISO, organization must decide quality objectives and policies and should also strictly adhere to the same without any defects. Once when the organizations realized the need for quality assurance, evolved suitable policies and objectives then it could be ascertained that that organization started to implement quality management system in their organization.

QUALITY

Quality is primarily concerned with meeting the wants and needs of customers. One of the key and enduring definitions is that, 'quality is fitness for purpose'. Quality can be described as doing the right thing, in the right way on right time as well as doing it right the first time and doing it right every time. In the context of the Library, it can be described as:

- Q - Quest for excellence of knowledge
- U - Understanding the user's need
- A - Actions to achieve user's demand
- L - Leadership quality for Librarian
- I - Involving all staff
- T - Team spirit in achieving common goals
- Y - Yardstick to measure progress

TQM CONCEPTS

Zalinawathi reported that TQM is the process through excellence in performance could be achieved. TQM is defined as both a philosophy and a set of guiding principles that represent the foundations of a continuously improving organization. It is the application of qualitative methods and human resources to improve all the processes within an organization and exceed customer needs now and in the future. According to this author, TQM incorporates all fundamental management techniques, existing improvements, and technical tools under a disciplined approach.

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Churchill & Paul[8] during 1980's brought about a business process of continuous improvement to satisfy customers needs. On due implementation of TQM, the promises of the organization could be successfully be attained in by integrating customer satisfaction and operational aspects of the business.

Handy[14] stated Total Quality Management as 'the world keeps changing. It is one of the paradoxes of success that the things and ways that get you where you are, are seldom the things that keep you there'. He also opined that organization while successfully implement TQM initiatives often focus on continuous improvement determining the related critical success factors as the basis.

During the implementation process of TQM, it is essential to have a strong support from all levels of management. This will lead not only to the smoothest implementation but also help organization to successfully attain what they expected to achieve during their operations. If there are pitfalls while implementing TQM or when it is not fully received the support of the top management, then all the efforts taken in this regard would become unfruitful results to the organization. This was identified as the common cause for the failure of TQM programmes by, Schein[28]. It is the essential responsibility of senior management teams to extend their high level support to TQM initiatives. Once when this happens, it would raise level of confidence among the employees so that the efforts in implementing TQM initiative would fetch the desired results at ease. In every TQM programmes, there are two primary aspects such as: employee empowerment and the other are being employees' involvement in the process. This was rightly pointed out by, Torrington & Hall[34] stating that "difficulties experienced in adopting TQM have mainly focused on people issues".

TQM PRINCIPLES

According to Galyani Moghaddam[11] TQM is the application of a number of activities with perfect synergy. The following are the most important elements of any Total Quality Management Programme:

- Customer-Driven Quality.
- Top Management Leadership and Commitment.
- Continuous Improvement.
- Fast Response.
- Actions Based On Facts.
- Employee Participation.
- A TQM Culture.

CUSTOMER-DRIVEN QUALITY

In the recent years, most organization primarily operates their business focusing the target customers as they are the sole and fulcrum of the business. Their primary object is to keep their customers feel happy forever based on the saying "Customer is the King". Hence while TQM is likely to be implemented they focus all their programmes towards the customers despite internal and external constraints. These organizations strongly have a faith that successful implementation of TQM and perfect adoption definitely would help to meet their customer's expectation. They consider that once if the customer is satisfied or delighted with the offering of the organization, that would be because of the successful TQM programmes. According to Stark[18] the TQ organization is sensitive to customer requirements and respon rapidly to them. In the TQM context, "being sensitive to custom requirements" goes beyond defect and error reduction and merely meeting specifications or reducing customer complai The concept of requirements is expanded to take in not o product and service attributes that meet basic requirements, also those that enhance and differentiate them for competi advantage. Each part of the organization is involved in to quality, operating as a customer to some functions and a supplier to others.

TQM LEADERSHIP

Stark[18] Associates explains that TQM is a way of life for organization. It has to be introduced and led by top manageme Attempts to implement TQM often fail because top manageme does not lead and get committed - instead it delegates and pays service. Commitment and personal involvement are requi from top management in creating and deploying clear qua values and goals consistent with the objectives of the compa and in creating and deploying well-defined systems, methods performance measures for achieving those goals. These syste and methods guide all quality activities and encour participation by all employees. The development and use performance indicators is linked, directly or indirectly, customer requirements and satisfaction, and to management employee remuneration.

CONTINUOUS IMPROVEMENT

American Society for Quality[1] outlined continuous improvem as 'Continuous improvement is an ongoing effort to impro products, services or processes'. These efforts can se 'incremental' improvement over time or breakthrou improvement all at once. Among the most widely used tools continuous improvement is a four-step quality model-the pl do-check-act (PDCA) cycle, also known as Deming Cycle Shewhart Cycle:

- Plan: Identify an opportunity and plan for change.
- Do: Implement the change on a small scale.
- Check: Use data to analyze the results of the change a determine whether it made a difference.
- Act: If the change was successful, implement it on a wi scale and continuously assess your results. If the change not work, begin the cycle again.

Other widely used methods of continuous improvement- such six sigma, lean, and total quality management - empha employee involvement and teamwork; measuring a systematizing processes; and reducing variation, defects a cycle times.

Continuous or Continual?

The terms continuous improvement and continual improvem are frequently used interchangeably. But some qua practitioners make the following distinction:

- Continual improvement: a broader term preferred by W Edwards Deming to refer to general processes of improvem and encompassing 'discontinuous' improvements i.e., m different approaches, covering different areas.

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Continuous improvement: a subset of continual improvement, with a more specific focus on linear, incremental improvement within an existing process. Some practitioners also associate continuous improvement more closely with techniques like statistical process control.

FAST RESPONSE

Stark[18] describes that fast response as the one that help organization to achieve customer satisfaction, by properly responding rapidly to the changing customer needs. It means that shorter product and service introduction cycles. These can be achieved with customer-driven and process-oriented product development because the resulting simplicity and efficiency greatly reduce the time involved.

Simplicity is gained through concurrent product and process development. Efficiencies are realized from the elimination of non-value-adding effort such as re-design. The result is a dramatic improvement in the elapsed time from product concept to first shipment.

ACTIONS BASED ON FACTS

Fact-based decision making or actions is the one that organization practice in order to know how well an organization is performing, data on performance measures is necessary. TQM requires that an organization continually collect and analyze data in order to improve decision making accuracy, achieve consensus, and allow prediction based on past history.

EMPLOYEE PARTICIPATION

All employees participate in working toward common goals. Total employee commitment can only be obtained after fear has been driven from the workplace, when empowerment has occurred, but management has provided the proper environment. High-performance work systems integrate continuous improvement efforts with normal business operations. Self-managed work teams are one form of empowerment.

TQM CULTURE

In a TQM effort, all members of an organization participate in improving processes, products, services, and the culture in which they work. The methods for implementing this approach come from the teachings of such quality leaders as Philip B. Crosby, W. Edwards Deming, Armand V. Feigenbaum, Kaoru Ishikawa, and Joseph M. Juran.

TQM IN LIBRARY AND INFORMATION SERVICE

TQM is at present not emerging as one of the management technique, but also felt very essential by several organizations in all disciplines. Just like other organization, Library and Information Services had also felt the vital aspects of TQM and started for the implementation of TQM. The application of TQM in Library and Information Services had started to gain importance in the late 1980's. The application of Total Quality Management in Library and Information Centers seems to be a very recent phenomenon but it is not so in the Indian context wherein Dr. S. R. Ranganathan, father of Library and Information Science stated in his Fourth Law 'Save the Time of the User' has direct implication with what is advocated in TQM approach as enunciated by Deming[6].

In India, very rarely studies have been conducted on Total Quality Management in the University Library System. Certainly we do find a few studies attempted on Corporations R&D Libraries and fewer Special Libraries.

Stuart & Drake[31] deals with benchmarking and Total Quality Management in academic libraries focusing on valued service to customers as competition from alternate information sources reveals the inadequacies of traditional service. Georgia Institute of Technology, Library and Information Center devised a version of TQM to focus attention on customer needs and provide content based, value added information services. As the primary agents in customer interaction, front line staffs are driving innovation and the marketing of services. Statistical quality control to assess information transactions adequately are not yet worked out and anecdotal evidence of success or failure is still the primary measure of service success.

Rout[27] had commented that Total Quality Management principles are yet to be applied in the libraries of India and this new approach to library management can be adopted to achieve success in the library operations and programmes. Further discusses the implementation of TQM in university libraries and suggests a TQM model to bring a total quality approach for a customer-focused library and concludes with a remark that TQM is likely to bring about greater participation of employees in information management activities in university libraries.

Meera[21] states that TQM is a people-focused management system that aims at the continual increase in customer satisfaction at continually lower cost. It is not a tool in itself, but the tools and techniques for Statistical Process Control form an essential part of TQM exercises. The study describes Process flow diagrams, Pareto diagrams and Cause-effect diagrams, and their applications in the management of libraries and information centers and other techniques of TQM, which can also be used in the library environment but need statistical computations.

Many libraries have implemented TQM successfully. Harvard College Library created a task force which rewrote the library's vision statement, and considered changes that would have to be made in order to develop a new organizational culture- one that 'highlights the changing nature of staff roles and responsibilities in an era of pervasive change' Clack[9]. With the help of consultants, Harvard learned about TQM, and found that its principles of service excellence, teamwork, ongoing training and skill building, process/systems focus, continuous improvement, and cooperation across boundaries could help them make the changes they needed.

The Oregon State University Libraries also decided to test TQM. Two small teams, the Shelving Team from the stack maintenance unit, and the Documents Team from the government publications unit worked with outside facilitators. Each team surveyed users and staff and found that some issues, perceived as critical by staff, were not perceived as critical by customers and therefore needed rethinking in terms of TQM. The Shelving Team, which wanted to address the problem of long lasting shelving backlogs, found that the shelves, who worked alone on the floors, felt isolated and unmotivated to make progress. Using this information, the teams devised a plan for servers work in small groups and have an assigned floor. The result was an increased 'esprit de corps', tidier mantelpiece, and fewer backlogs Butcher[6].

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Sirkin[29] suggests some ways a library might use the principles of TQM to enhance library services.

- Create service broachers and information kits.
- Conduct a user survey about library services.
- Improve signage.
- Change hours of operation.
- Provide a more convenient material return.
- Simplify checkout of material.
- Use flexibility in staff assignment.
- Co-operate with local government.
- Ask vendors to give products demonstration.
- Give new staff a through orientation.
- Create inter departmental library advisory groups.
- Improve the physical layout of the library.
- Track complaints.
- Develop an active outreach programme.
- Open satellite offices.
- Publicize new or changes services.
- Develop user and staff training materials.
- Target services o specific groups.
- Offer electronic document delivery.

BENEFITS OF TQM IN LIBRARIES

Miller & Stearns[22] if implemented carefully, quality management principles yield positive benefits to the libraries such as:

- Incremental changes lead to continuous improvement-quick solutions may yield only partial results.
- Forces library managers develop leadership skills interested of replaying on power within position to obtain results.
- Increase staff participation in decision-making, thus increasing the feeling of ownership of decisions and directions once charted.
- Improves the level of training given to staff, thus increasing skills.
- Helps break down barriers between library departments and improve communication within the organization.

CONCLUSION

The paper concludes with an idea after perusing various literatures stating that Total Quality Management is a way wherein it could any management for improving its effectiveness, efficiency, flexibility and competitiveness among the libraries as a whole by making each and every employee to get involved with an intention to improve the performance of the organization in all spheres. This eventually keeps the customers feel happy and highly satisfied with the services offered by the organization. Libraries can also excel in its performance by maintaining the Quality standards and conformities as prescribed in TQM Principles employing necessary tools and techniques. In the recent years it was noted that TQM has increasingly being practiced in libraries of developed countries for last two decades. In effect to the implementation and regular adoption of TQM, libraries were able to establish a culture of continuous improvement and started to offer quality product and services. Indian libraries started to practice TQM which is in the nascent stage and still expected to grow in the years to come.

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Measuring Library Performance of RYM Engineering College, Bellary in Karnataka Using Balanced Score Card: A Case Study

Adoni Gururaja

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Research Scholar
School of Social Sciences
IGNOU, New Delhi

Corresponding Author
Adoni Gururaja
agradoni@gmail.com

ABSTRACT

The basic objective of the present paper is to evaluate the library performance of RYM Engineering College, Bellary in light of the balanced score card four perspectives. The availability of data in library is providing a basis for study of the library management in RYM Engineering College, Bellary. The data from the library source enabled to develop the library score card with a generic set of key performance indicators, which is used as a tool for evaluating the performance of Library. Gap theory method is adopted to identify the performance gap. SPSS Software and Scattered diagram is used to know the correlation in every perspective of score card. The results of the research show that: there is a strong, direct and significant positive relation in every perspective of the score card.

KeyTerms: Performance Measurement, Key Performance Indicators, Performance Gap, Balanced Score Card.

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INTRODUCTION

Academic institutions and its libraries help to enhance the knowledge base of the Nation and therefore play a vital role in shaping the future of the Nation. Emerging global trends, new economic challenges, change of library users needs and the rapid growth of information technology has placed libraries in much sharper focus and hence its performance assessment becomes essential. Thus, the study focus on RYM Engineering College library, Bellary to assess the performance by using balanced score card.

The literature suggest that balanced score card is the most appropriate management system to assess the performance and is best suited to support the present requirement of libraries, which provides balanced information from all possible areas and also allows alignment of wide variety of parameters with the unique strategy and mission of the libraries. The goals and measures of library have been identified and presented for a generic balanced scorecard model for assessing the performance of library.

LIBRARY PROFILE

RYM Engineering College Library, Bellary is established along with parent institution in the year 1980 with prime objective is to support the parent organization programmes. It is integrated with departmental distribution units for timely access of needed information at the work place, enfolded e-library and integrated to the regular class room learning through campus network to enhance the body of knowledge. Library is automated with SOUL Software for its housekeeping operations and collaborated with national information network agencies for developing sharing culture of e-resources and database. It is enriched 1,23,000 volumes of books with 8700 titles and subscribed 10 print and e-journals.

BALANCED SCORE CARD (BSC)

Balanced Score Card is a management system developed by Robert S. Kaplan and David P. Norton. It is devised a framework based on four perspectives-financial, customer, internal business process and learning and growth. The organization should select critical measures for each of these perspectives. It provides the user with a set of information which addresses all relevant areas of performance in an objective and unbiased fashion. It gives a set of measures to top managers to get a comprehensive view of the business. Balanced Score Card provides a balanced picture of overall performance highlighting activities that need to be improved and it combined both qualitative and quantitative measures. It relates performance to the choice of strategy. It includes measures of efficiency and effectiveness. It assists business in clarifying their vision and strategies and provides a means to translate them into action. An attempt has been made for implementing BSC in library.

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formance evaluation is a system of a group of financial and
on financial measurements and indicators. It aims to measure
e results level of every variable. Performance measures used in
e balanced score card approach tend to fall into four groups. As
performance measurement tool of strategic management, the
lanced scorecard approach may help on specifying the
mpetitive advantage of the library and lead objectives that
ue to achieve its goals. It helps in solving the problem of the
ach.

EY PERFORMANCE INDICATORS FOR LIBRARIES

y Performance Indicators are building blocks of balanced score
d four perspectives. In order to measure the performance of
rary from the point of view of balanced scorecard perspectives,
jectives and measures (indicators) have been identified with
e help of a balanced scorecard analysis, the library could be
ded through four perspectives: financial sustainability, user
isfaction, business processes streamlining and learning and
owth. These four are linked to each other in a way that the
ccess of one perspective leads to the success of the other. The
als of learning and growth perspective help in the development
internal business, which in turn aids in user satisfaction. All
gether these three perspectives lead to better financial growth
at helps the library to survive and perform better. It is important
see where an institution is moving and if the institution's
rformance is still in line with its vision.

ITERATURE REVIEW

ezhorn et al[1]. This article reports on the implementation of the
lanced Scorecard model for facilitating strategic management
the Academic Information Service (academic library) of the
iversity of Pretoria, South Africa. Robert Kaplan and David
rton developed the concept of the Balanced Scorecard in the
ly 1990s for motivating and measuring performance. This
nagement methodology is seen as an excellent vehicle for
plementing organizational transformation measures in the
ademic Information Service. The article starts by giving a short
oretical introduction to the concept of the Balanced
orecard, followed by an outline of the implementation of the
orecard on both the strategic and operational levels. It
ncludes by examining the ways in which the Balanced
orecard is currently being used to facilitate the strategic
nagement process at the Academic Information Service.

on, C. & Hogan, C.[2] This paper discusses issues and strategies
implementing Balanced Scorecard to facilitate strategic
arning in a university library. Bond University has been using
e Balanced Scorecard to measure and manage its performance.
me of the challenges in implementing the Balanced Scorecard is
ecting appropriate performance measures for the four areas of
e Balanced Scorecard which are: Financial perspective - how
e look to stakeholders? Customer perspective - how do our
stomers see us? Internal business processes - what must we
el at? Innovation and learning - how can we continue to
prove and create value? Other challenges include collecting
d desired information and systematizing its production and
alysis. Alignment of libraries with the university's performance
asurement methodology and identification of the library's
ntribution to the University's overall performance are not
ays straightforward. Specifically this paper will discuss how
e Balanced Scorecard in a university library can facilitate
linking the strategic and operational Library with that of the University; explore cause-effect relationships between performance measures and mapping of the Balanced Scorecard to the activities of the Library.

Gulcin, C.[3] Human Resource Development: Impacting on all four perspectives of the Balanced Scorecard. This paper will discuss human resource development (HRD) in the context of the Learning and Growth perspective of the Balanced Scorecard (BSC) approach to strategic management in university libraries. 'Learning and Growth' perspective focuses on the organisation's ability to continue to improve and create value for its stakeholders. The paper will explore human resource development in the context of the evolutionary process involving a shift from training to a learning orientation in libraries in order to create value for the organization's stakeholders which range.

Ling, Z.[4] Come across the goal system of the strategic plan about the library service in foreign university libraries includes the resource access, the information literacy, reference services and research guides, subject services, information commons, the service evaluation and the service marketing, etc. He identified that strategic plan about the library service in foreign university libraries are not only the macro-guidance for the library service, but also details and goals for the library service. He provides some suggestions on framing the strategic plan and developing all kinds of library services for Chinese university libraries.

NEED & SIGNIFICANCE

As a public organization, libraries should responsible to safe guard the interest and benefits of their stake holders. The present study has a significant role in assessing the current performance level of library using Balanced Scorecard and to ensure that the factors such as keeping pace with the changing environment, developing positive organizational behavior, strengthening decision making, minimizing the effects of adverse conditions, encouraging better attitude towards changes, matching and timely resource allocation are in place and in the long run make the library professionals as strategic investigators.

.Performance evaluation of libraries is also having significance for self assessment, accreditation and getting performance based grants from the regulatory authorities. Thus, the study is needed for the librarians and authorities concerned for better understanding of the existing performance and to modify the strategic plan of the library for better performance towards achieve the library objectives.

RESEARCH PROBLEM

Sustainability of libraries is fully dependent upon its performance. Therefore, there is a need to identify the area of improvement and to inject the pragmatic strategies for better performance. Thus, the present case study is undertaken to know 'Where is college library?', 'Where college library want to be in the future?' and 'What to do to achieve the better performance?' The problem of the present study is entitled as 'Measuring library performance of RYM Engineering College, Bellary in Karnataka Using Balanced Score Card: A case study'.

OBJECTIVES

The prime objective of the study is to evaluate the performance of the library by using Balanced Score Card and to suggest strategies

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for improving better performance. The following objectives are framed in the study :

- To measure the library performance gap of every key performance indicator of Balanced Score Card Four Perspectives by rating the ranks.
- To assess the library performance gap of Balanced Score Card Four Perspectives by rating the ranks.
- To identify the area of Improvement through performance gaps and to suggest strategies to bridge the performance gaps.
- To examine the Correlation of Score Card Four Perspectives.

DATA SOURCE & METHODOLOGY

The data for the study has been collected from the library source by using balanced score card. It consisted both qualitative and quantitative data and enable to develop the library score card with a generic set of 25 key performance indicators (KPI), which was used as a tool for evaluating the library performance of RV Engineering College, Bellary.

Gap theory method used to measure performance gap of library. SPSS Software was used to test the correlation of every variable and four perspectives of Balanced Score Card. Radar Chart and scattered diagram used for graphical presentation. The unit value of each performance measure is mentioned against them as shown in the library score card.

DATA ANALYSIS & INTERPRETATION

The data sets collected from the library has been analyzed by using score card. Gap Analysis Theory was used to identified the Performance gap (Area of Improvement) of KPIs and BSC four perspectives of library. Performance Gap was measured as:

Performance Gap = Target Score minus Actual Score

Table 1: Measurement of Performance Gap

Goals & Objectives	Performance Measures	Score			Rank
		Target	Actual	Gap	
1. To Improve Service Effectiveness	**U-Users' Perspective:**	**525**	**459**	**66**	03
Provide tailor made services	U1- Users' Satisfaction (percentage)	100	88	12	12
-do-	U2 - Users' Retention (in hundred)	30	28	02	04
To Take User Care	U3 - Users' Complaints Attempts	60	50	10	11
Provide facilities for optimum usage of sources & services	U4- Seats Available	150	130	20	09
-do-	U5 - Workstations Available	15	12	03	13
-do-	U6 Added Required Media (inHundred)	40	38	02	03
-do-	U7 - Library Working Hours (in 100)	36	35	01	01
-do-	U8-Library Visits (in thousands)	12	10	02	11
-do-	U9 - Documents Turnover (in ten1000)	70	60	10	10
Aware the library users for self & lifelong learning	U10 - Orientation Session Hours	12	08	04	16
2. To Provide Cost Effective Services	**F- Financial Perspective :**	**148**	**134**	**14**	02
Planning, allocation mathing and control of funds	F1 - Expenditure on Users (in lakhs)	20	18	02	05
-do-	F2 - Expenditure on Staff (in Lakhs)	18	16	02	08
-do-	F3 - Expenditure on Media (in Lakhs)	40	38	02	03
-do-	F4-Expenditure on Media Process(Lakh)	05	04	01	13
Optimum usage of funds	F5 - Budget Utilization (in Lakhs)	65	58	07	07
3. To Improve Process Efficiency	**P- Process Perspective :**	**157**	**135**	**22**	01
provide just in time services	P1 - Reference Queries Filling (in Tens)	28	25	03	06
To minimize labour cost & process time	P2 - Media Acquisition Speed (in days)	40	30	10	15
-do-	P3 - Media Processing Speed (in days)	35	30	05	10
-do-	P4 - Shelving Accuracy (in Hundreds)	50	48	02	02
change for speed process	P5 - Process Improvement Initiatives	04	02	02	17
4. To Improve Speed of Staff	**L - Learning & Growth Perspective :**	**138**	**103.77**	**34.23**	04
Motivate and Encourage	L1 - Staff Satisfaction (percentage)	100	74.77	24.33	16
Welfare & Development	L2 - Staff Retention	14	11	03	14
Improve professional Skills	L3 - Training Hours for Staff	10	08	02	13
Improve staff performance	L4 - Professional Development	04	02	02	17
Staff involvement	L5 -Suggestions for System Improvement	10	08	02	13

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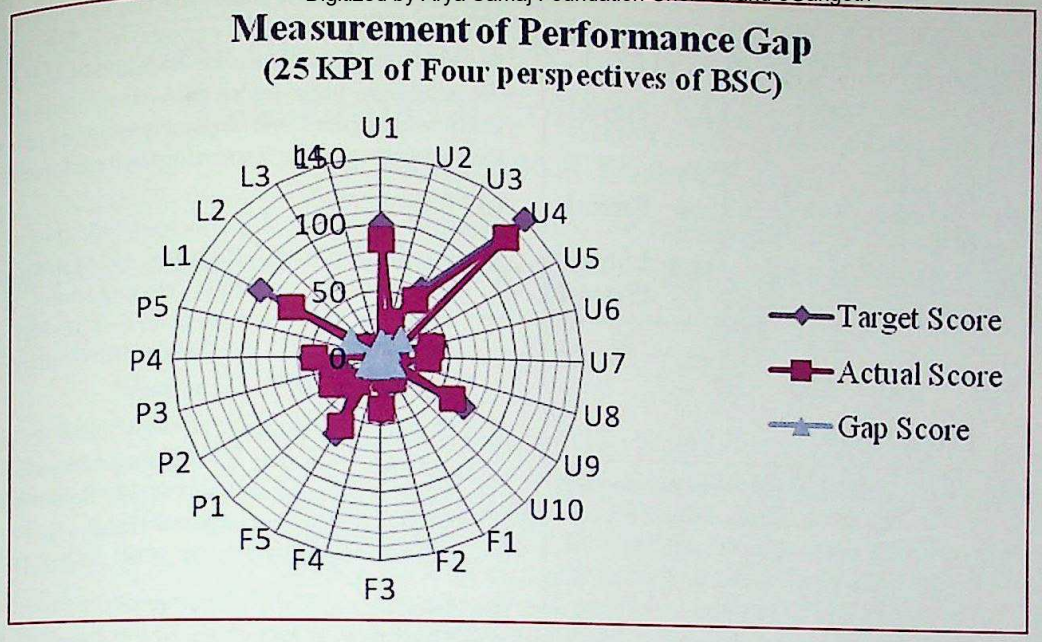

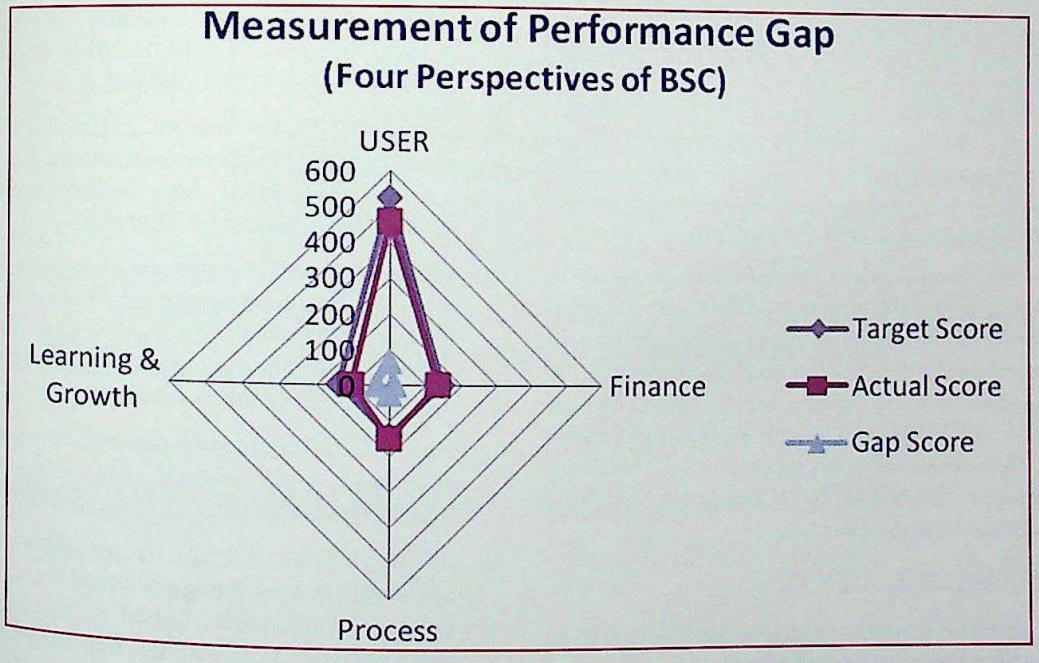

The above table 1 Library Score Card Shows that Performance ...p of Key Performance Indicators. Library Working Hours (U7), ...ieving Accuracy (P4) has been rated 1st and 2nd respectively; ...ided Required Media (U6) and Expenditure on Media (F3) has ...en rated 3rd as highest ranks and it indicates good ...formance. Budget Utilization (F5), Expenditure on Staff (F2) ...d Seats Available at Library (U4) has been rated 7th, 8th and 9th ...moderate ranks respectively and it indicates marginal average ...formance. However, Process Improvement Initiatives (P5), ...h Professional Development (L4), has been rated 17th rank, ...entation Session Hours (U10), Library Staff Satisfaction (L1) ...h been rated 16th and Media Acquisition (P2) has been rated ...th rank as least ranks and it indicates the baseline poor ...formance.

The above table also reveals that performance gap of four ...spectives of balanced score card. Process perspective (P), has ...en rated 1st as highest rank, which indicates good performance. Financial Perspective (F) and Library user perspective (U) has been rated 2nd and 3rd as moderate ranks respectively, which indicates marginal average performance. However, learning and growth perspective (L) has been rated 4th as least rank, which indicates the base line poor performance

Table 2: Correlation Coefficients of Four Perspective of BSC

S. No	Perspective	r	Significance
1	Library User	0.998	0.01**
2	Library Finance	0.999	0.01**
3	Library Internal Process	0.948	0.05*
4	Learning and Growth	1.000	0.01**

**Correlation is Significant at 0.01 level
*Correlation is Significant at 0.05 level

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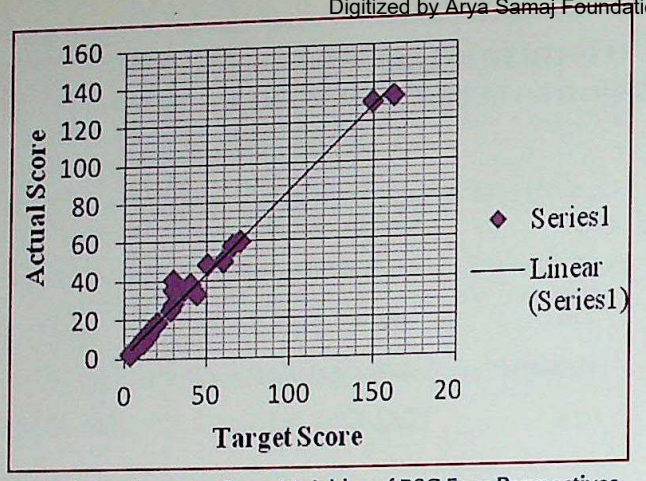
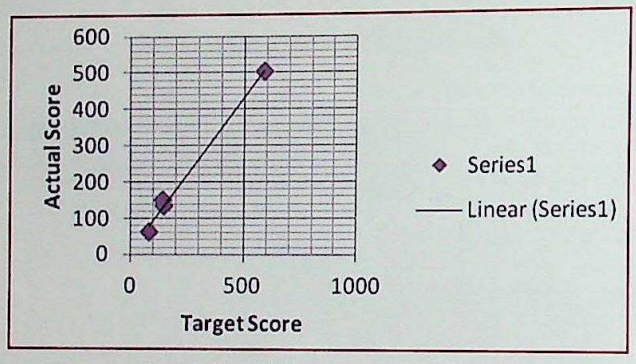


Correlation between Every Variables of BSC Four Perspectives



Correlation of BSC Four Perspectives

Table 2 reveals that there is high and significant correlation between every variable and the total degree of all the BSC four perspectives. Library User, Library Finance and Learning and Growth perspectives at the significance level 0.01 and Internal Process at the significance level 0.05, the "r" values located between 0.948 and 1.000, which means that there is high validity coefficient in four perspective of balanced score card. The above scattered diagrams show the positive correlation of every variable and balanced score card four perspectives.

SUGGESTIONS & CONCLUSION

- The library should encourage, motivate the library staff to enhance their knowledge and competencies.
- The library should support to the library staff for giving high sophisticated technology training programs to improve the performance for readiness.
- The library needs to integrate new initiatives of technology for Improving processes efficiency.
- The library should afford more advanced, innovative and tailor made User's centered services to meet the library user's expectations.
- The library should conduct more orientation session hours to the library users for better knowing and using of library sources and services

The result of the study shows that there is significant correlation every variable of BSC four perspectives. BSC is proved that, it is holistic, robust performance measurement tool and suitable the academic libraries for their sustainable development. Thi study helps to the librarian and authorities concerned to modi their strategic plan for improving their performance.

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Students' View on Library in ICT Environment: A Study of Lala Lajpatrai College, Mumbai

J.H. Kadli* and S.K. Bhosale**

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*Librarian
**Asstt. Librarian
Lala Lajpatrai College of Commerce & Economics
Mumbai

Corresponding Author
J.H. Kadli
jhkadli@gmail.com

ABSTRACT

Students are an important user group for their college libraries. Academic libraries are trying very hard to balance the resources and users' needs, especially in this changing environment. The information needs & seeking behaviour of students is being changed by electronic resources. The approach towards resources is constantly changing due to changing formats of information. This study was undertaken to observe the students view on library resources, ICT facilities/services, and their use of library at Lala Lajpatrai College, Mumbai. The results from this study will be useful to enhance the collection development and to implement innovative services to meet students' needs more effectively. This will also provide an answer to how, which and where the library can improve the ICT facilities.

A 'Google online survey' and hard copies of questionnaire were used for this study. The survey was conducted between March and April 2013. The online survey was sent randomly to 400 students of all courses and 385 students were responded which amounts the response rate 96.25%. This paper establishes the importance of a cross-sectional study in understanding the students' information needs, view on library services in different years of their studies.

KeyTerms: Students Information Needs, Library Use, Library Resource, Academic Library, College Library, ICT Facilities, Online Survey.

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INTRODUCTION

With new technological developments and innovations the new challenges and prospects were arise. The academic library, as a service centre, has for centuries played a critically-important role in developing collections, services, and organizational structures to facilitate users' needs. Brown[1] conducted a study on scholarly communication in the digital world. The study claimed that the internet and information-sharing systems brought convenience into scholarly communication. Brown shows that these new technologies make a significant impact on scholarly communication as it has brought people closer in virtual communication.

It is clear that the new information technology will bring users new information-seeking patterns. In order to develop better collections and services to meet users' new expectations, the understanding of users' information needs is the key to it, Mckenzie[2]. ICT is often perceived as a catalyst for change, change in teaching styles, and change in learning approaches and in access to information, Watson[3]. The Internet and the www are constantly influencing the development of new modes of scholarly communications. Libraries are redesigning their services, and information products, incorporating new technologies upgrading information resources, training people, changing information objectives, modes of communication and information delivery, in order to add value to their services and to satisfy the changing information needs of user community.

MOTIVATION FOR THE STUDY

This study is informed by the need to carry out a research with focus on College Libraries as there has been no study on students view in Mumbai colleges about computer, Internet and library services in changing ICT environment. The syllabus is changed; new format of examination is introduced; library oriented study/learning; change in learning infrastructure (class room as well as library). This study was also restructured to explore on the information needs of the students. This would assist teachers to know their students better. It also a service guide for Lala Lajpatrai

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college library in developing ICT Infrastructure.

This study is therefore of high importance to faculty and library as it would provide a guide to drafting a 3 year strategic plan which includes the teaching of information communication technology in their study/learning and implementing new services through ICT.

OBJECTIVES OF THE STUDY

In this study, the main aim is to find out students' view and whether students make the optimum use of library resources and services/facilities.

The objectives of the study are as follows:

- Find out the students' acquaintance with Internet.
- Discover the level of experience in computer operations.
- Know the place and frequency of use of computers/internet by students.
- Identify the importance of computers/internet facility in library.
- Know the satisfaction of students in using college library resources.
- Asses the library staff performance.

DESIGN/METHODOLOGY

A questionnaire was designed in google survey forms and administered to investigate the view on library by students studying in various courses in different years of their studies. A 'google online survey' and hard copies of questionnaire were used for this study. The survey was conducted between March and April 2013. The online survey was sent randomly to 400 students of all courses and 385 students were responded which amounts the response rate 96.25%.

SCOPE & LIMITATIONS

The study covers students from all courses and is limited to undergraduate students of Lala Lajpatrai College. It does not include students of the postgraduate and pre university level in the sample.

DATA ANALYSIS

The data obtained through the questionnaires has been analyzed, interpreted, organized and tabulated under various headings as given below:

- **Personal Profile of the Respondents**

Table 1: Personal Profile of the Respondents

Streams	B.Com	BAF	BBI	BMM	BMS	BSc CS	BSc IT	Grand Total
Female								
Age	30(7.79)	5(1.30)	5(1.30)	10(2.59)	20(5.19)	0	25(6.49)	95 (24.67)
18 year	15	5	0	10	5	0	0	35(9.09)
19 year	15	0	5	0	5	0	10	35(9.09)
20 year	0	0	0	0	5	0	10	15(3.89)
21 year	0	0	0	0	5	0	0	5(1.30)
24 year	0	0	0	0	0	0	5	5(1.30)
Male								
Age	145(37.66)	5(1.30)	20(5.19)	10(2.59)	80(20.77)	10(2.59)	20(5. 19)	290(75.32)
17 year	0	0	0	5	0	0	0	5(1.30)
18 year	40	5	5	0	20	0	0	70(18.18)
19 year	65	0	10	0	30	0	10	115 (29.87)
20 year	20	0	5	0	10	5	5	45(11.68)
21 year	20	0	0	5	10	5	0	40(10.39)
22 year	0	0	0	0	5	0	5	10(2.60)
23 year	0	0	0	0	5	0	0	5(1.30)
Grand Total	**175(45.45)**	**10(2.59)**	**25(6.49)**	**20(5.19)**	**100(25.97)**	**10(2.59)**	**45(11.69)**	**385 (100)**

(Figures in parentheses indicate the percentage)

Table 1 shows the category of the respondents combined with course-wise, age-wise and gender-wise. Out of total 385(100%) respondents, 95(24.67%) are female and 290(75.32%) are male. Male and female are equally responded from BAF 5(1.30%) & BMM 10(2.59%) courses. B.Com. Course respondents are highest 175(45.45%), BAF and BSc CS respondents are equal in number but very

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...10(2.59%) among all respondents. Second highest ...100(25.97%) are BMS. Considering age-wise ...ndents, 19 year respondents are highest in both gender ...ups (male & female) among all respondents.

Frequency of Library Visit

Table 2: Frequency of Visit

Frequency	Students	%age
Daily	130	33.77
Once in a Week	115	29.87
Fortnightly	80	20.78
Once in a Month	45	11.69
Others	15	3.89
Total	385	100

...shows in the table 2, that highest 130(33.77%) number of ...pondents are using the library daily, followed by 115(29.87%) ...it once in a week and 80(20.78%) visit the library fortnightly, ...11.69%) are visiting once in a month. Depending on the ...irements 15(4%) respondents use the library at times or ...ly.

Purpose of Visit to Library

...question was asked about purpose of visit to library and the ...ources & facilities used by respondents. The multiple choice ...ions were asked as the users visit the library for multiple ...poses.

Table 3: Purpose of Visit

Purpose	Students	%age
Books	255	66.23
e-Books/Video CDs	30	7.80
Reference Books	95	24.67
NewsPapers/Periodicals	130	33.76
Photocopy	150	38.96
Internet Access	175	45.45

...observed from the study that Table 3 reveals majority of the ...pondents visit library to borrow/refer books, i.e., 255, followed ...a purpose to access internet 175, photocopy 150, purpose of ...to refer the newspapers is 130. For reference books 95, ...pondents visit the library. Small number 30 of respondents visit ...library to use the e-books/video CDs.

Use of Computer Facilities

...observed that, respondents frequently use computers for their ...dy and learning. More than half a respondents 195(50.66%) ...daily, followed by 100(25.97%) at least once/twice a week, ...18%) are fortnightly, 20(5.19%) are once a month. The ...shown in fig 1 is rounded off.

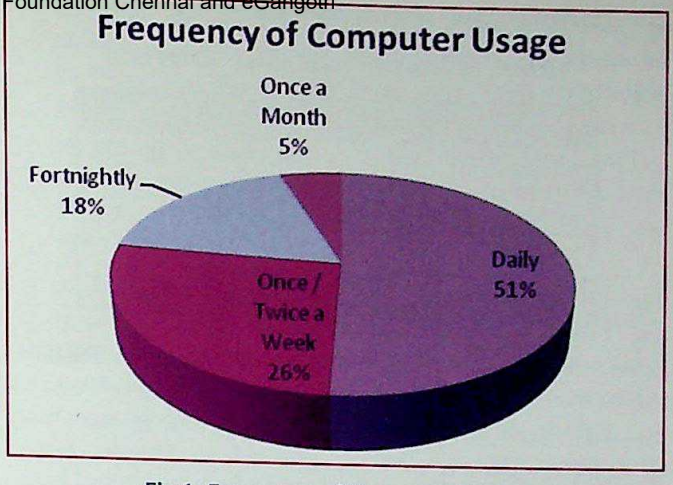

Fig.1: Frequency of Computer Usage

Place of Access and use of Computer/Internet

Table 4: Place of Access and Use

Place	Students	%age
Home	325	84.41
Cyber Café	35	9.09
Library	200	51.94
Computer Lab	25	6.49

Respondents were asked to choose suitable answers all that apply to them (more choices). Table 4 explains that, more than half of the respondents 325 use computers and access internet in home. Then given library as a second 200 preferred place. Then followed by with very less respondents 35 & 25 preferred cyber café and college computer lab respectively.

Opinion on Library (Resources, Services and Facilities)

For any college library, along with the good resources, services and ICT facilities the basic seating arrangement and space is also very important. This is true in the responders' view that maximum 285 responders like seating & reading space.

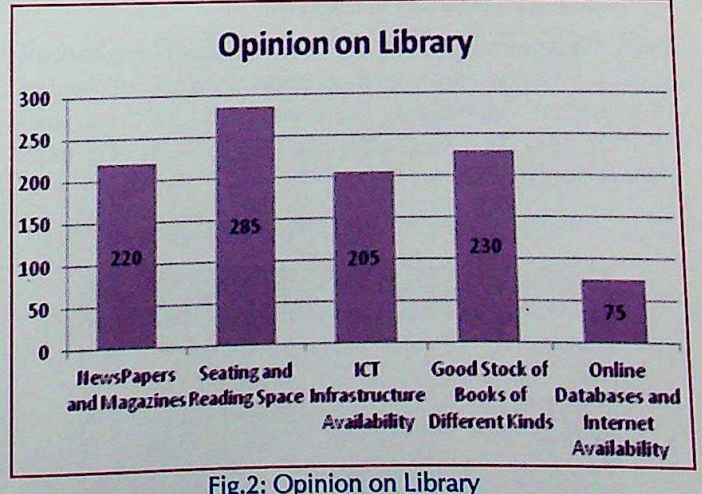

Fig.2: Opinion on Library

Then, followed by 230(59.74%) like good stock of books of different kinds, 220(57.14%) like newspapers/magazines, 205(53.24%) like ICT infrastructure availability and very least respondents 75(19.48%) like online databases and internet availability.

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❑ **Satisfaction Level about Library Staff**

Table 5: Satisfaction Level about Library Staff

Opinion	Students	%age
Satisfied	255	66.25
Not Satisfied	50	12.98
Neutral	80	20.77
Total	**385**	**100**

Table 5 describes that majority of respondents 255(66.23%) have shown their satisfaction with the assistance being provided and the attitude of library staff in locating and in searching information from the books / information sources. Fewer respondents 50(12.98%) say they are not happy with the library staff. More than 1/5th of total respondents i.e. 80(20.77%) were not sure about themselves that library staff helps or not.

❑ **Satisfaction Level about Library**

Table 6: Satisfaction Level about Library

Opinion	Students	%age
Highly Dissatisfied	5	1.30
Dissatisfied	30	7.80
Satisfied	95	24.67
Moderately Satisfied	170	44.16
Highly Satisfied	85	22.07
Grand Total	**385**	**100**

Table 6 shows, majority of respondents 170(44.16%) say they were moderately satisfied. Followed by 95(24.67%) satisfied, 85(22.07%) highly satisfied. Few respondents were 30(7.8%) dissatisfied and negligible amount of 5(1.3%) respondents were highly dissatisfied. This indicates that respondents are moderately satisfied. This shall be also proved through the mean value of respondents which equals to 4. i.e. Moderately satisfied.

❑ **Opinion about Library Management**

Table 7 illustrates highest 175(45.45%) number of respondents, have opinion that, the library management is better. Followed by, 110(28.57%) respondents say good, 45(11.70%) say bad, 40(10.38%) say best. Few respondents 15(3.90%) say the library management is worst.

Table 7: Opinion about Library Management

Opinion	Students	%age
Worst	15	3.90
Bad	45	11.70
Good	110	28.57
Better	175	45.45
Best	40	10.38
Grand Total	**385**	**100**

FINDINGS

Based on the analysis of the survey the following findings can be arrived as:

- Among all respondents 19 year respondents are higher in both gender groups (male & female). Highest 130(33.77%) respondents use the library daily, followed by 115 (29.87%) use it once in a week.
- The majority of the respondents visit the library to borrow/refer books, i.e., 255(66.23%), followed with a purpose to access internet 175(45.45%), photocopy 150(38.96%). This indicates that, in this changing ICT environment students prefer still printed books as their first choice then followed by internet. Though they access internet in different places for their information, books are their first choice.
- More than half a respondents 195(50.66%) use computers daily. Followed by more than 1/4th of the respondents 100(25.97%) use at least once/twice a week, It is good to see that the use of computers are more by students in their study.
- The majority of respondents 255(66.23%) has shown their satisfaction with the assistance being provided and the attitude of library staff in locating and searching information from the books / information sources. Highest 175 (45.45%) number of respondents, have opined that, the library management is better.

SUGGESTIONS

Based on the findings, following suggestions are recommended to improve the services and collection in the library:

- Small number 30 of respondents visit the library to use the e-books/video CDs. The library should encourage the students to use audio/video CDs and offer training in digitization of documents.
- The library should teach the students 'how to search information on internet' and also the different integrated features of the browsers.
- Library staff is very helpful in nature as responded by students. That should be continued with good enthusiastic. The library should encourage students to learn the latest information search skills, as well as promote the library services and resources more and more.
- The librarian should encourage students to learn the latest information-seeking tools and skills, as well as promote the library services and resources more and more.

CONCLUSION

In these days the college students are flooding towards library with assignments, dissertations. Information seeking and gathering is a challenging task for the students. Information needs and seeking behavior is likely to differ from one discipline to another. The present study shows the different views of students on library resources services and facilities used. The study revealed that, students used a variety of information sources and services. It is clear by the study that, in this age of electronic resources, most of the students (respondents) still using books as information source for their academic purpose. It proves us that

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ooks are not losing their importance in the electronic/Internet

e.

s evident by the study that, majority of the users has shown their isfaction towards helpfulness of library staff for the assistance ing provided in searching information. Information resources d services needs to be increased. Internet facility and ncouragement in use of electronic databases (free or paid) uld be more facilitated. This will maximize user satisfaction el and ultimate goal of any library.

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Research output in Physics & Multidisciplinary areas by the Universities of Gujarat: A Scientometric Analysis

U.A. Thaker*, N.D. Oza**, R.R. Makwana*** and S.G. Patel****

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*Prof. & Head, DLIS
**Asst. Prof, DLIS
Sardar Patel University
Gujarat

***Librarian
Samarth College of Education.
Gujarat University
Gujarat

****Librarian
Grow more College of BCA
HNG University
Berna, Himmatnagar
Gujarat

Corresponding Author
U.A. Thaker
oza_nd@yahoo.co.in

ABSTRACT

This paper examines the contribution of faculty members of the universities in Gujarat particularly in the areas of Physics and multidisciplinary. For the study data collected from web of science for the period of span under the study. Various search strategies were applied to collect the data and Scientometric techniques used to achieve research objectives. The study found cited items, citing articles, h- index of universities and faculties in the subject area. The study further recommended for the establishment of citation database for the publication in Indian languages to provide such platform for scholarly communication in Indian languages to keep a pace with the latest research trends.

KeyTerms: Scientometric Analysis, Web of Science, Physics and Multidisciplinary, Scholarly Communication, Contribution Output.

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INTRODUCTION

The contribution study is useful to understand research & development in subject concern at National and International level. Its relevance can be traced out so far the contribution of a group of universities located in the specific geographic area to the larger counterpart in the specific domain. The present study focuses on contribution in Physics and its allied areas by faculty members of the universities in Gujarat.

Physics and its allied areas having a long and fruitful evidence of its development in every sphere of life by the continuous research. Speedy reporting and seamless access make spectacular changes in the arena of research in every nation. Scholarly journals and its bibliographic control plays inevitable role to scale the research and its navigational direction.

Web of Science is a Bibliographic database covers prestigious and high impact research journals of sciences across the world. According to the Badenhorst[1] of Worldwide Information Services - it is an online academic citation database provided by Thomson Reuters. It is designed for providing access to multiple databases cross-disciplinary research and in-depth exploration of specialized subfields within scientific discipline. As a citation index, any cited paper lead to any other literature (book, academic journal, proceedings, etc.) which currently, or in the past cites this work. In addition, literature which shows the greatest impact on a field covered by Web of Science, or more than one discipline, can be selectively obtained. For example, a paper's influence can be determined by linking to all the papers that have cited it. In this way, current trends, patterns and emerging fields of research can be assessed. Web of Science has indexing coverage from the year 1900 to the present.

OBJECTIVES

- To study the contribution in Physics and multidisciplinary area in the Universities and find out the h-index.
- Faculty wise contribution and the h-index of the faculty.

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- To co-relate the trends of research at National and International level.

SCOPE & LIMITATIONS

The study measures research productivity in Physics and Multidisciplinary area contributed by the faculty members of Universities in Gujarat. It covers following 7 Universities and its faculty members in the Physics departments.

- Bhavnagar University, Bhavnagar (BUB)
- Gujarat University, Ahmedabad (GUA)
- Hemchandracharya North Gujarat University, Patan (HNGU)
- Maharaja Sayajirao University, Vadodara (MSU)
- Sardar Patel University, Vallabh Vidyanagar (SPU)
- Saurashtra University, Rajkot (SUR)
- Veer Narmad South Gujarat University, Surat (VNSGU)

METHODOLOGY

The study has been undertaken keeping in mind the contribution of faculty of universities and comparative analysis in Physics and Multidisciplinary area for which data has been collected from 1998 to 2011 from Web of Science.

Researchers have extracted data from web of science for the period of span under the study. Various search strategies were applied to collect the data and scientometric techniques used to achieve research objectives.

ANALYSIS OF DATA

Universities-wise Research Output

Table 1: Universities-wise Research Output

University	Physics and Multidisciplinary			
	Articles	No. of Time Cited	Average Citations	h- index
BUB	18	60	3.33	4
GUA	25	85	3.40	4
HNGU	0	0	0.00	0
MSU	37	118	3.19	6
SUR	30	80	2.67	6
SPU	82	150	1.83	6
VNSGU	9	17	1.89	2

It is observed from table 1 that MSU, SUR and SPU have 6 h-index which is highest. While BUB and GUA have 4 h-index. VNSGU has 2 h-index which is lowest one.

Total 201 articles have been written by the faculty of Universities in Gujarat within the span of 1998-2011. Individually 82 articles, the highest numbers have been written by SPU while not a single article has been written from HNGU has 0 h-index and 0 results found. Hence, HNGU is excluded herein after from the study.

Most Cited Authors

To find out the most cited author of Gujarat within selected universities data has been analyzed as shown in table 2.

Table 2: Most Cited Top Ten Authors of Gujarat

Univer-sity	Author	Cited Items	%age
GUA	Vyas, A.D., & Rana, V.A.	28	19.18
BUB; MSU	Mehta, R.V., Patel, R., Desai, R., Upadhyay, R.V.& Parekh, K.	18	12.33
BUB	Ramchand, C.N., Pande, P., Kopcansky, P. & Mehta, R.V.	17	11.64
MSU	Pradhan, A., Jotania, K. & Singh, A.	14	9.59
GUA	Vyas, A.D. & Rana, V.A.	14	9.59
SPU	Joshipura, K.N., & Antony, B.K.	12	8.22
SPU	Patel, M.H., Vora, A.M., Gajjar, P.N., & Jani, A.R.	11	7.53
SPU	Baria, J.K. & Jani, A.R.	11	7.53
SUR	Parmar, V.G., Modi, K.B. & Joshi, H.H.	11	7.53
MSU	Pradhan, A., Pandey, P., Jotania, K. & Yadav, M.K.	10	6.85
Total		**146**	**100**

Table 2 shows the most cited top ten authors of universities in Gujarat. Out of that Vyas, A.D. and Rana, V.A. are from Gujarat University secure first position i.e. 28(19.18%) items cited by others, while Pradhan, A., Pandey, P. Jotania, K. and Yadav, M.K. from MSU are in last position i.e. 10(6.85%) items cited by others.

Individual Authors' Contribution

To find out individual authors contribution and its relative h-index data are analyzed as shown in table 3.

Table 3: Top Ten Authors h-index & Other Information

University	Author	h-index	Results found	No. of times cited	No. of times cited without self citations	Citing Articles	Citing Articles without self citations	Average citations per item
GUA	Vyas, A.D.	4	13	79	60	67	59	6.08
	Rana, V. A.	4	17	82	61	70	60	4.82

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University	Author	h-index	Results found	No.of the times cited	No.of times cited without self citations	Citing Articles	Citing Articles without self citations	Average citations per item
BUB; MSU	Mehta, R.V.	10	47	394	350	317	293	8.38
	Patel, R.	10	103	410	358	341	322	3.98
	Desai, R.	5	20	62	58	60	56	3.10
	Upadhyay, R.V.	10	56	414	369	331	300	7.39
	Parekh, K.	7	33	164	147	135	122	4.97
BUB	Ramchand, C.N.	7	11	358	358	338	338	32.55
	Pande, P.	1	1	20	20	20	20	20.00
	Kopcansky, P.	2	2	114	114	114	114	57.00
	Mehta, R.V.	10	47	394	350	317	293	8.38
MSU	Pradhan, A.	7	12	125	107	86	77	10.42
	Jotania, K.	3	6	36	32	32	29	6.00
	Singh, A.	8	68	215	176	180	158	3.16
GUA	Vyas, A.D.	4	13	79	60	67	59	6.08
	Rana, V.A.	4	17	82	61	70	60	4.82
SPU	Joshipura, K.N.	12	31	375	248	190	161	12.10
	Antony, B.K.	7	12	176	146	107	97	14.64
SPU	Pate,l M.H.	4	14	109	98	58	52	7.79
	Vora, A.M.	11	84	390	43	89	23	4.64
	Gajjar, P.N.	7	38	238	168	89	63	6.26
	Jani, A.R.	9	77	341	227	164	118	4.43
SPU	Baria, J.K.	4	24	70	35	48	31	2.92
	Jani, A.R.	9	77	341	227	164	118	4.43
SUR	Parmar, V.G.	1	1	13	13	13	13	13.00
	Modi, K.B.	10	52	271	171	185	153	5.21
	Joshi, H.H.	9	38	210	177	160	144	5.53
MSU	Pradhan, A.	7	12	125	107	86	77	10.42
	Pandey, P.	2	5	14	14	14	14	2.80
	Jotania, K.	3	6	36	32	32	29	6.00
	Yadav, M.K.	5	8	76	74	73	72	9.50

Table 3 shows that Joshipura, K.N.(SPU) has highest h-index i.e.12 separately, while Pande, P. (BUB) and Parmar, V.G.(SUR) has lowest i.e. only 1 h-index separately.

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University-wise Faculty's Cited Items

University-wise individual faculty's cited items calculation is presented in table 4

Table 4: Top Ten Cited Authors of BUB

Authors	Cited Items	%age
Mehta, R.V., Patel, R., Desai, R., Upadhyay, R.V. & Parekh K.	18	32.73
Chandrachand, C.N., Pande, P., Jayaransky, P. & Mehta, R.V.	17	30.91
Upadhyay, T. & Parekh, K.	6	10.91
Vyas, A.D., Rana, V.A., Bhatnagar, S.P. & Vashisth, V.M.	5	9.09
Patel, J.K., Annapurna, M. & Trivedi, M.M.	3	5.45
Parekh, R.,Desai,R., & Upadhyay, R.V.	2	3.64
Jagtiani, M.A. Shukla, R.S., Hari, K. & Misra, S.N.	2	3.64
Acharya, P., Desai, R., Aswal, K. & Upadhyay, R.V.	1	1.82
Mehta, R.V., Desai, R., Bhatt, K. & Upadhyay, R.V.	1	1.82
Desai, R., Davariya, V., Parekh, K. & Upadhyay. R.V.	0	0.00
Total	55	100

From the table 4, it is observed that out of total 55 cited items of top ten cited authors of BUB as Mehta, R.V., Patel, R., Desai, R., Upadhyay, R.V. & Parekh, K. are most cited by others i.e. 18 cited items (32.73%) is highest while Desai, R., Davariya, V., Parekh, K. & Upadhyay, R.V. are not cited by others, even a single time.

Table5: Top Ten Cited Authors of GUA

Authors	Cited Items	%age
Vyas, A.D., & Rana, V.A.	28	38.89
Rana, V.A., & Vyas, A.D.	14	19.44
Pandya, T.C., Vyas, P.R., Pandya, C.V., & Gohel V.B.	6	8.33
Vyas, A.D., Rana, V.A., Bhatnagar, S.P., & Vashisth, V.M.	5	6.94
Upadhyapati, A.N., Rana, V.A.,& Vyas, A.D.	4	5.56
Vyas PR; Pandya CV; Pandya TC; Gohel VB	3	4.17
Patel, N.K., Vyas, P.R., Joshi, A.R., & Gohel, V.B.	3	4.17
Rana, V.A., & Vyas, A.D.	3	4.17
Pandya, C.V., Vyas, P.R., Pandya, T.C., Rani, N., & Gohel, V.B.	3	4.17
Vidhisha Vidhisha, N., & Patel, L.K.	3	4.17
Total	72	100

Table 5 shows that 72 cited items of top ten cited authors of GUA which Vyas, A.D. and Rana V.A. are most cited by others i.e. 28(38.89%) cited items is highest while authors shown in last 5 is found relatively less cited by others i.e. 3 cited items (4.17%) which is the lowest.

Table 6: Top Ten Cited Authors of MSU

Authors	Cited Items	%age
Mehta, R.V., Patel, R., Desai, R., Upadhyay, R.V.& Parekh K.	18	20.93
Pradhan, A., Jotania, K.,& Singh, A.	14	16.28
Pradhan, A., Pandey, P., Jotania, K., & Yadav, M.K.	10	11.63
Rangarajan, G., & Sant, D.A.	9	10.47
Kota, V.K.B., Chavda, N.D., & Sahu, R.	8	9.30
Chavda, N.D., Potbhare, V., & Kota, V.K.B.	7	8.14
Chavda, N.D., Potbhare, V., & Kota, V.K.B.	6	6.98
Singh, N.L., Gadkari, M.S., & Chintalapudi, S.N.	6	6.98
Vyas, M., Kota, V.K.B., & Chavda, N.D.	4	4.65
Jha, P.K., Aynyas, M., & Sanyal, S.P.	4	4.65
Total	86	100

From the table 6 it is observed that 86 cited items of top ten cited authors of MSU as Mehta, R.V., Patel R., Desai R., Upadhyay, R.V. and Parekh, K. are most cited by others i.e. 18 cited items 20.93% is highest while Vyas, Kota & Chavda as well as Jha, P.K., Aynyas, M., Sanyal, S.P. are less cited by others i.e. 4 cited items 4.65% which are the lowest.

Table 7: Top Ten Cited Authors of SPU

Authors	Cited Items	%age
Joshipura, K.N., & Antony, B.K.	12	16.67
Patel, M.H., Vora, A.M., Gajjar, P.N., & Jani AR	11	15.28
Baria, J.K.,& Jani, A.R.	11	15.28
Thakor, P.B., Patel, V.N., Thakore, B.Y., Gajjar, P.N., & Jani, A.R.	7	9.72
Jivani, A.R., Trivedi, H.J., Gajjar, P.N., & Jani, A.R.	6	8.33
Gajjar, P.N.,Thakore, B.Y., & Jani, A.R.	6	8.33
Thakor, P.B.,Gajjar, P.N., & Jani, A.R.	6	8.33
Pandya, J.N., & Vinodkumar, P.C.	5	6.94
Jivani, A.R., Gajjar, P.N., & Jani, A.R.	4	5.56
Patel, M., Vaidya, R., Dave, M., Patel, S.G., & Oza,, A.T.	4	5.56
Total	72	100

From the table 7, it is observed that 72 cited items of top ten cited authors of SPU. Joshipura, K.N. & Anatony, B.K. is most cited with 12(16.67%) items while authors in last two rows are less cited by others i.e. 4(5.56%) cited items.

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Table 8: Top Ten Cited Authors of SUR

Authors	Cited Items	%age
Parmar, V.G., Modi, K.B., & Joshi, H.H.	11	16.92
Dabhi, R.M., Parekh, B.B., & Joshi, M.J.	10	15.38
Bhatu, S.S., Lakhani, V.K., Tanna, A.R., Vasoya, N.H., Buch, J.U., Sharma,P.U., Trivedi,U.N.,Joshi,H.H.,& Modi, K.B.	8	12.31
Joshi, V.S.,& Joshi, M.J.	8	12.31
Solunke, M.B., Sharma,P.U.,Pandya, M.P., Lakhani, V.K., Modi, K.B., Reddy, P.V., & Shah, S.S.	6	9.23
Rana, D.S., Nirmala, R., & Malik, S.K.	6	9.23
Subbarao, M.V., Yusuf, S.M., Kulkarni, R.G., & Rao, L.M.	5	7.69
Chauhan, C.K., Joseph, K.C., Parekh, B.B., & Joshi, M.J.	4	6.15
Parikh, K.D., Parekh, B.B., Dave, D.J., & Joshi, M.J.	4	6.15
Markna, J.H., Vachhani, P.S., Parmar, R.N,, Kuberkar, D.G., Misra, P., Singh, B.N,, Kukreja, L.M., Rana,D.S., & Malik, S.K.	3	4.62
Total	**65**	**100**

From the table 8, it is observed that 65 cited items of top ten cited authors of SUR. Parmar, V.G., Modi, K.B., and Joshi, H.H. are most cited by other i.e. 11(16.92%) cited items while Markna, J.H., Vachhani, P.S., Parmar, R.N., Kuberkar, D.G., Misra, P., Singh, B.N., Kukreja, L.M., Rana, D.S., and Malik, S.K. are less cited by others i.e. 3 cited items 4.62% which is the lowest.

Table 9: Top Ten Cited Authors of VNSGU

Authors	Cited Items	%age
Chavda, L.K.,& Chavda, A.L.	4	25
Agarwal, M.K., Patel, Y., & Vashi, M.N.	4	25
Kuperkar, K., Abezgauz, L., Danino, D., Verma, G., Hassan, P.A., Aswal, V.K., Varade, D., & Bahadur, P.	2	12.50
Thakor, P.B., Gajjar, P.N., & Jani, A.R.	2	12.50
Vashi, M.N., Patel. N.G., Patel, Y., & Agarwal, M.K.	2	12.50
Bharatiya, B., Aswal, V.K., & Bahadur, P.	1	6.25
Thakor, P.B., Gajjar, P.N., & Jani, A.R.	1	6.25
Vaidya, .DJ., & Poria, K.C.	0	0
Total	**16**	**100**

From the table 9, it is observed that 16 cited items of top ten cited authors of VNSGU. Chavda, L.K. and Chavda, A.L. are most cited by others i.e. 4 cited items 25% while Vaidya, D.J. and Poria, K.C.are not cited by others, even single time.

❑ Country-wise Cited Items

The contribution of universities and its distribution so far as concern to cited items by various countries are presented in table 10.

Table 10: Country-wise Cited Items

Country	BUB	GUA	MSU	SPU	SUR	VNS GU	Total	%age
Algeria	0	0	0	1	0	0	1	0.27
Argentina	0	0	0	0	1	0	1	0.27
Australia	1	0	1	0	0	0	2	0.55
Bahrain	0	0	0	0	0	2	2	0.55
Belgium	0	0	0	1	0	0	1	0.27
Brazil	1	0	2	0	2	0	5	1.37
Bulgaria	1	0	0	0	0	0	1	0.27
Canada	1	0	0	0	1	0	2	0.55
China	4	0	1	0	4	0	9	2.46
Croatia	1	0	0	0	0	0	1	0.27
Cuba	0	0	1	0	0	0	1	0.27
Czech Republic	1	0	0	0	0	0	1	0.27
Egypt	0	0	0	0	2	0	2	0.55
England	0	0	0	1	0	0	1	0.27
France	0	0	0	1	0	0	1	0.27
Germany	1	1	1	0	0	1	4	1.09
India	30	70	63	64	52	9	288	78.69
Iran	0	0	3	0	0	0	3	0.82
Ireland	0	0	0	0	0	1	1	0.27
Israel	0	0	1	0	0	1	2	0.55
Mexico	0	0	1	0	0	0	1	0.27
Pakistan	0	0	0	2	0	0	2	0.55
Poland	1	0	0	0	1	0	2	0.55
Romania	2	0	0	0	1	0	3	0.82
Russia	0	0	0	1	0	2	3	0.82
Saudi Arabia	0	0	3	0	0	0	3	0.82
Serbia	0	0	1	0	0	0	1	0.27
South Africa	1	0	0	0	0	0	1	0.27
Spain	1	0	5	0	0	0	6	1.64
Sweden	1	0	0	0	0	0	1	0.27
Taiwan	1	0	0	0	0	0	1	0.27
Tunisia	0	0	0	0	1	0	1	0.27
Turkey	0	0	1	0	0	0	1	0.27
USA	7	1	2	1	0	0	11	3.01
Total	**55**	**72**	**86**	**72**	**65**	**16**	**366**	**100**

Table 10 show cited item country-wise. The total numbers of cited items cited in different countries. It is observed that most of the cited items i.e. 288(78.69%) are cited in India, while very few items cited by other countries i.e. 11 items cited in USA while 4 items cited in China.

❑ Subject-wise Cited Items

The contribution of universities and its distribution so far as concern to cited items by various subject categories are presented in table 11.

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Table 11: Subject-wise Cited Items

Subject Category	Cited Items	%age
Astronomy & Astrophysics	10	2.73
Chemistry, Analytical	1	0.27
Chemistry, Multidisciplinary	4	1.09
Chemistry, Physical	6	1.64
Crystallography	12	3.28
Engineering, Mechanical	1	0.27
Environmental Sciences	1	0.27
Food Sciences & Technology	1	0.27
Materials Science, Biomaterials	2	0.55
Materials Science, Multidisciplinary	20	5.46
Mechanics	1	0.27
Metallurgy & Metallurgical Engineering	3	0.82
Meteorology & Atmospheric Sciences	5	1.37
Multidisciplinary Sciences	6	1.64
Optics	11	3.01
Physics	2	0.55
Physics, Applied	20	5.46
Physics, Atomic, Molecular & Chemical	24	6.56
Physics, Condensed Matter	49	13.39
Physics, Fluids & Plasmas	2	0.55
Physics, Mathematical	31	8.47
Physics, Multidisciplinary	134	36.61
Physics, Nuclear	5	1.37
Physics, Particles & Fields	5	1.37
Plant Sciences	1	0.27
Polymer Science	1	0.27
Public, Environmental & Occupational Health	1	0.27
Spectroscopy	4	1.09
Urology & Nephrology	3	0.82
Total	**366**	**100**

The table 11 shows that total 366 cited items are published in 29 subject categories as above. It shows that highest number of cited items contributed in 'Physics and Multidisciplinary' i.e. 134(36.61%) then 49(13.39%), 31(8.47%) and 24(6.56%) number of cited items in 'Physics, condensed matter', 'Physics, mathematical', 'Physics, atomic, molecular & chemical' and less cited items published in other subject category.

FINDINGS

Web of Science is very much helpful to know the research quality, research productivity and research output. On the basis of analysis of collected data the present study concludes that:

- The highest h- index (6) is found of SPU, MSU and SUR while BUB and GUA are second ranked with 4 h-index, VNSGU is third ranked with 2 h-index.
- It is found that most cited author such as Vyas AD, Rana VA from GUA comes on first rank as most cited author; they were cited 28 times which is the highest, while Mehta, R.V., Patel, R., Desai, R., Upadhyay, R.V. and Parekh, K. from BUB and MSU comes on second rank as most cited author; they were cited 18 times which is the second highest.
- It is found on the basis of top ten cited author's h-index, that the highest h-index 12 & 11 respectively of Joshipura, K.N. and Vora, A.M from SPU.
- Top ten cited authors have been ranked. First author Vyas AD; Rana VA from GUA while Pradhan A; Pandey P; Jotania K; is last ranked author of MSU.
- On the basis of country-wise analysis of cited items, it is found that most of the items cited in India i.e. 288(78.69%) while very less items cited by other countries. The total number of cited items is 366 in different subject categories. Out of these subject categories, 134 items cited in Physics and Multidisciplinary, which is highest research publication in this area.

SUGGESTIONS

On the basis of the study with Scientometric analysis in physics and multidisciplinary some feasible suggestions are mentioned here for further improvement.

- There should be some arrangement and provision to motivate faculty and researcher to engage in the area of Research in the current trends with a team of dedicated researcher.
- Strong channels for effective communication for scholarly publication should be implemented with sound planning. This may guide the prospective authors to publish their research work in highest impact factor journals.
- Motivate authors for writing and publish in open access journals to scale it on larger and longer audience and usability. This can be sort out with the deposition of research paper in an institutional repository or a subject repository at state/ national level.
- Engage the faculties to review on published research work to foster peer communication channels.
- Encourage the faculties to maintain professional social contacts with others in pertinent research area.
- Some training programme should be organized for effective use of Web of Science and Web of Knowledge.

RECOMMENDATIONS

During the process of this study researchers observe that there is strong need to establish such type of Citation Database. India should look forward and prepare such platform covering scholarly communication in Indian languages to keep a pace with the latest research trends.

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Internet Usage by the Teachers and the Students of Two Technical Colleges of Gujarat: A Comparative Study

Raxa Raysinh Solanki* and Ranjita N. Dash**

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*Librarian
Aryakanya Shuddha Ayurved Mahavidyalaya
Baroda
**Librarian
Babaria Institute of Pharmacy
Vadodara

Corresponding Author
Raxa Raysinh Solanki
raxa_rs@yahoo.co.in

ABSTRACT

This paper provides a brief introduction of Internet. The questionnaire method was used to collect data from the teachers & students of two self finance institutes (SFI) of Gujarat. The data were collected from 38 teachers of Parul Institute of Engineering & Technology (PIET) out of 50 & 36 teachers of Sardar Vallabhbhai Patel Institute of Technology (SVIT) out of 50. In the same way data were collected from 70 students of PIET out of 100 and 65 students of SVIT out of 100. The aim of this study was to analyze the use of the Internet and related issues among the teachers and students of Self Finance Engineering Colleges of Gujarat, India. It was intended in the present survey for internet such as, experience of internet use, amount of time spent for internet, most frequently used location for internet use, purpose for internet used, use of internet services, use of internet resources, ways to browse information from the internet, favorite search engine. Internet had brought dramatic changes in the generation, communication and dissemination of information. It was found that the internet mostly used for education, research, teaching and communication purpose. Some suggestions have been set forth to make the service more beneficial for the academic community of the engineering colleges under study.

KeyTerms: Internet, Search Engine, Internet Resources, SFI, Engineering Colleges.

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INTRODUCTION

The Internet has led to the creation of a stimulating academic environment by completely modernizing the tools of learning as well as the process of teaching, learning and research. It is no wonder that it has tremendously transformed the approach of the researchers and students towards information seeking and the methods they employ for research and learning activities. In such an academic environment, institutions of higher learning such as engineering colleges are also doing their best to provide their users access to this vast reservoir of information. Technology has changed and enriched every walk of human life. Application of technology in teaching and learning for improving academic quality has become the main focus of educational research. Broadly speaking information technology deals with information system data storage, access retrieval analysis and intelligent decision making for enhancing organizational effectiveness. Information is disseminated in society through various channels. These channels are libraries; Internet, T.V., Radio, News Papers, etc. play an important role in dissemination of information.

Having realized that IT is a valuable tool within various fields of human activity, nations of the world are dressing themselves to the mechanism by which the benefit of the IT revolution can reach the common man. We are living in an era of information revolution, where internet applications work in every field of human life. The information needed by one must be obtained quickly and efficiently in terms of time, effort and accessibility. It also provides the opportunities to any type of communication. Its combination with recent technologies has transformed the process of communication of information, which may be in textual form or in multimedia (video, audio, graphics, etc.) form. This multimedia information is easily accessible and does not require paper to communicate.

LITERATURE REVIEW

Hanauer[2] surveyed a diverse community college to access the use of the Internet by students. The survey showed that although all of the students surveyed had free Internet access through their community college, only 97% of them reported having access. The survey showed that 83% of Internet users had access to the

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Internet at their home and 51% of them accessed the Internet at college or the library. Eighty-one percent of the students reported to access the Internet mostly for college work and 80% for e-mail/chat.

Asemi[1] did a case study of Medical Sciences University of Isfahan (MUI), Iran. The results of the study showed that all of the respondents made frequent use of the Internet because all faculties provided Internet connections. It was revealed that the researchers of the university were getting quality information through the Internet. 55% of the respondents searched for scientific information through the Internet because the university library had provided access to various databases and online journals for tall the students and staff. The investigator also found that the Google and the Yahoo search engines were more widely used as compared to the other search engines. The analysis of the study revealed that 54% of the Internet users always found useful information on the Internet. 31% of the respondents also indicated that quality information was available on the Internet.

OBJECTIVES

The main objective of this study is to analyze the patterns of Internet use, the Internet skills of the SFI engineering teachers & students, the perceived impact of the Internet on their academic efficiency. Besides this the following information was sought about the teachers and the students in SFI Engineering Colleges under study:

- To study the use of internet.
- To identify the frequency of internet used.
- To identify most frequently location used.
- To identify the different purposes that the Internet is used.

RESEARCH METHODOLOGY

For this study investigator used questionnaire method. The target population of degree courses (4 core courses & computer also) Teachers of PIET was 126 & the student was 2824. Whereas, target population of degree courses (4 core courses & computer also) Teachers was 103 & student was 1530 of SVIT. Accordingly, 300 questionnaires were distributed among the teachers and students of both engineering colleges (i.e.150 x 2 = 300) under study out of which 209 (i.e. 70/100 from Student & 38/50 from teacher of PIET and 65/100 from Student & 36/50 from teacher of SVIT) were received back duly filled in.

DATA ANALYSIS & DISCUSSSION

The problem for the further study is "Internet Usage by the Teachers & the Students of Two Technical Colleges of Gujarat: A Comparative Study". The collected data through questionnaire was organized tabulated and interpreted by using simple statistical methods. It was deals with the analysis and interpretation of data collected through questionnaire.

❑ Responses from Internet Users

■ Course-Wise Distribution of Respondents (Teachers)

Questionnaires are distributed among the respondents (teachers) of degree courses (four core courses & also computer) of PIET & SVIT. The Course-wise distributions of the respondents are given in the table 1.

Table 1: Course-wise Distribution of Respondents (Teachers)

Respondents (Teachers)	PIET						SVIT					
	Electrical	Mechanical	Civil	Electronics	Computer	Total	Electrical	Mechanical	Civil	Electronics	Computer	Total
Questionnaire Distributed	10	10	10	10	10	50	10	10	10	10	10	50
Response Received	7	8	6	8	9	38	8	6	5	7	10	36
%age	70	80	60	80	90	76	80	60	50	70	100	72

The above table 1 clearly shows out of 50 questionnaires distributed to teachers of PIET, 38(76%) are received & out of 50 questionnaires distributed to teachers of SVIT, 36(72%) are received. The analysis shows that, PIET Electrical. Course has a response rate 70% same as in SVIT has 80%, PIET Mech. Course has a response rate 80% same as in SVIT has 60%, PIET Civil Course has a response rate 60% same as in SVIT has 50%, PIET Elect. Course has a response rate 80% same as in SVIT has 70%. The highest rate is given by the Comp. course of PIET (90%) & SVIT (100%). This can be shown with the help of fig. 1given below.

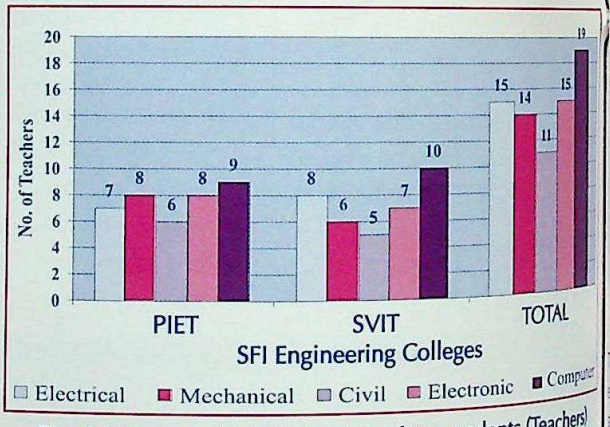

Fig. 1: Course-wise Distribution of respondents (Teachers)

■ Course-Wise Distribution of Respondents (Students)

Questionnaires are distributed among the respondents (students) of degree courses (four core courses & also computer) of PIET & SVIT. The Course-wise distributions of the respondents are given in the table 2.

Table 2: Course-wise Distribution of Respondents (Students)

Respondents (Students)	PIET						SVIT					
	Electrical	Mechanical	Civil	Electronics	Computer	Total	Electrical	Mechanical	Civil	Electronics	Computer	Total
Questionnaire Distributed	20	20	20	20	20	100	20	20	20	20	20	100
Response received	14	12	10	15	19	70	16	10	8	14	17	65
%age	70	60	50	75	95	70	80	50	40	70	85	65

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The above table 2 clearly shows out of 10 questionnaires distributed to students of PIET, 70(70%) are received & out of 100 questionnaires distributed to students of SVIT, 65(65%) are received. The analysis shows that, PIET Ele. Course has a response rate 70% same as in SVIT has 80%, PIET Mech. Course has a response rate 60% same as in SVIT has 50%, PIET Civil Course has a response rate 50% same as in SVIT has 40%, PIET Elect. Course has a response rate 75% same as in SVIT has 70%. The highest rate is given by the Comp. course of PIET 95% & SVIT 85%. This can be shown with the help of fig. 2 given here.

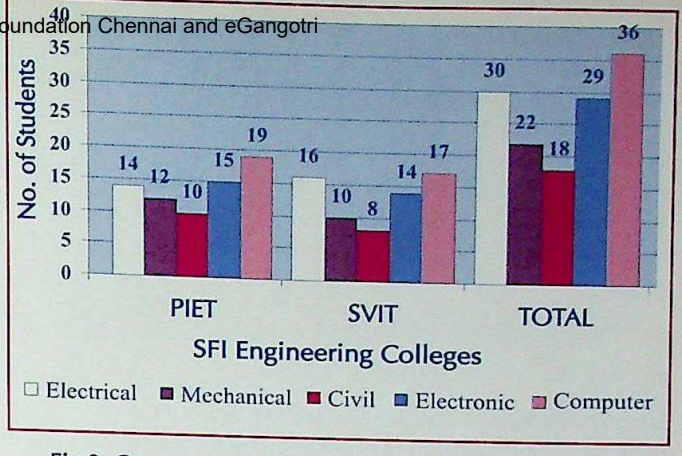

Fig 2: Course-wise Distribution of respondents (Students)

Frequency of Internet Use

Frequency of Using Internet by Teachers

The data on frequency of using Internet was also collected from the teachers. The time gap has been classified into four different categories. The table 3 indicates the frequency of using Internet by teachers.

Table 3: Frequency of Internet Use by Teachers

Frequency of Internet Use	No. of Teachers												Total PIET+SVIT N=74
	PIET						SVIT						
	Electrical	Mechanical	Civil	Electronics	Computer	Total	Electrical	Mechanical	Civil	Electronics	Computer	Total	
Daily	3	2	1	3	6	15	2	3	1	3	4	13	28 (37.84%)
2-3 times a week	4	4	2	5	2	17	4	3	1	2	4	14	31 (41.89%)
2-3 times a month	-	1	2	-	1	4	1	-	2	1	1	5	9 (12.16%)
Once in a month	-	1	1	-	-	2	1	-	1	1	1	4	6 (8.11%)
Total	7	8	6	8	9	38	8	6	5	7	10	36	74 (100%)

The table 3 reveals that 31(41.89%) of staff/teachers uses the Internet 2-3 times a week. 28(37.84%) of the respondents use the Internet every day, 9(12.16%) for 2-3 times in a month. Only 6(8.11%) of the respondents use it once in a month. On average the majority of the staff/teachers from both the engineering colleges use the Internet almost once in a week. In comparison of SVIT majority staff/teachers of PIET uses Internet 2-3 times a week.

Frequency of Using Internet by Students

The same data on frequency of using Internet was also collected from the students. The table 4 indicates the frequency of using Internet by students.

Table 4: Frequency of Internet Use by Students

Frequency of Internet Use	No. of Students												Total PIET+SVIT N=135
	PIET						SVIT						
	Electrical	Mechanical	Civil	Electronics	Computer	Total	Electrical	Mechanical	Civil	Electronics	Computer	Total	
Daily	5	4	1	7	6	23	6	5	3	4	7	25	48 (35.56%)
2-3 times a week	7	4	3	5	9	28	5	5	3	8	9	30	58 (42.96%)
2-3 times a month	2	2	2	2	4	12	3	-	2	-	1	6	18 (13.33%)
Once in a month	-	2	4	1	-	7	2	-	-	2	-	4	11 (8.15%)
Total	14	12	10	15	19	70	16	10	8	14	17	65	135 (100%)

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The table 4 reveals that 58(42.96%) of students uses the Internet 2-3 times a week. 48(35.56%) of the respondents use the Internet every day, 18(13.33%) for 2-3 times in a month. Only 11(8.15%) of the respondents use it once in a month. On average the majority of the students from both the engineering colleges use the Internet almost once in a week. In comparison of PIET majority students of SVIT uses Internet 2-3 times a week. In the fig. 3 clearly shows that majority of the students use Internet 2-3 times a week.

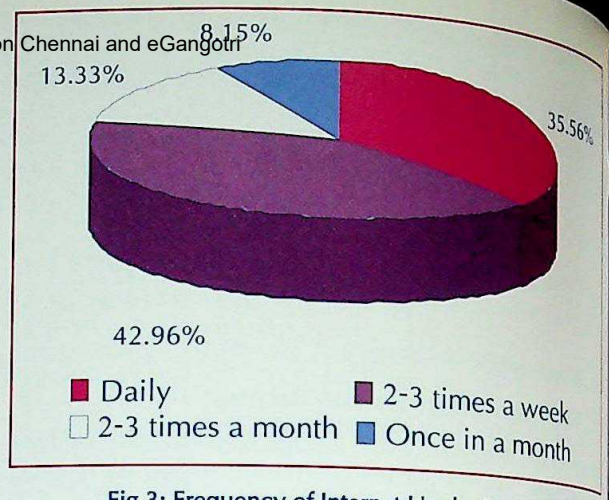

Fig 3: Frequency of Internet Use by Students

- **Place of Internet Use**
- **Location of Internet use By Teachers**

Investigator find out from where teachers access internet. Table 5 highlights the location from where the internet is mostly accessed by the teachers.

Table 5: Location of Internet Use by Teachers

Location of Internet Use	No. of Teachers												Total PIET+SVIT N=74
	PIET						SVIT						
	Electrical	Mechanical	Civil	Electronics	Computer	Total	Electrical	Mechanical	Civil	Electronics	Computer	Total	
Library	5	4	4	6	4	23	4	5	2	3	7	21	44 (59.46%)
College/Dept.	1	2	1	1	2	7	2	-	2	2	1	7	14 (18.92%)
Cyber Café	-	1	-	1	1	3	1	-	-	1	1	3	6 (8.11%)
Home	1	1	1	-	2	5	1	1	1	1	1	5	10 (13.51%)
Total	7	8	6	8	9	38	8	6	5	7	10	36	74 (100%)

Table 5 highlights the location from where the Internet is mostly accessed by the staff/teachers. A majority of the respondents i.e. 44(59.46%) access the Internet from the library, 14(18.92%) access the Internet at their college/dept., 10(13.51%) access the Internet from home, & only 6(8.11%) access the Internet from cyber café. Majority of the staff/teachers of both the colleges access Internet from library. Because in the library Internet facility free of cost to the staff/teachers. It is clearly shown in the fig 4.

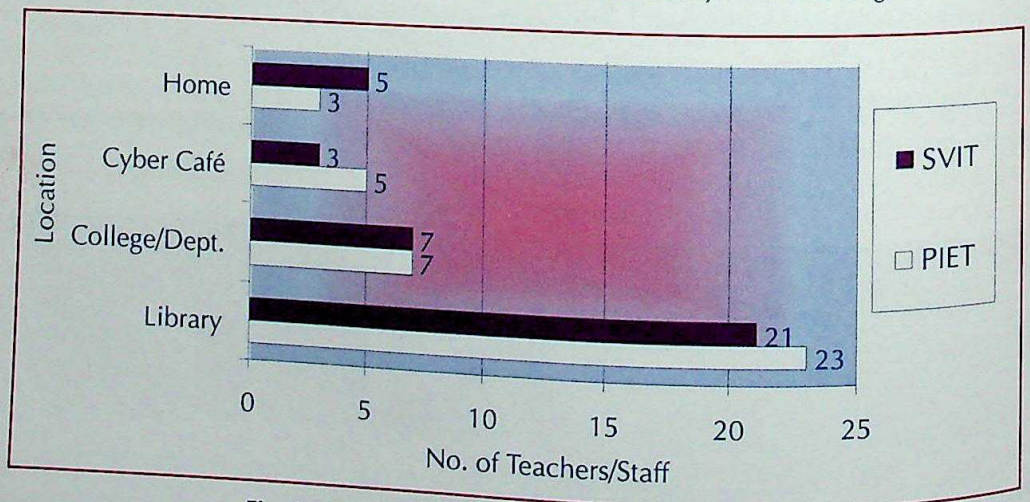

Fig. 4: Location of Internet Use by Teachers

- **Location of Internet use By Students**

The same data find out by Investigator from the students. Table 6 highlights the location from where the internet is mostly accessed by the students.

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Table 6: Location of Internet Use by Students

Location of Internet Use	No. of Students												Total PIET+SVIT N=135
	PIET						SVIT						
	Electrical	Mechanical	Civil	Electronics	Computer	Total	Electrical	Mechanical	Civil	Electronics	Computer	Total	
Library	9	7	7	6	11	40	8	7	7	9	14	45	85 (62.96%)
College/Dept.	1	1	-	2	3	7	2	2	1	2	3	10	17 (12.59%)
Cyber Café	1	-	1	1	2	5	1	-	-	2	-	3	8 (5.93%)
Home	3	4	2	6	3	18	5	1	-	1	-	7	25 (18.52%)
Total	14	12	10	15	19	70	16	10	8	14	17	65	135 (100%)

Table 6 highlights the location from where the Internet is mostly accessed by the students. A majority of the respondents i.e. 85(62.96%) access the Internet from the library because internet service in the library is free of cost for the students, 25(18.52%) access the Internet from home, 17(12.59%) access the Internet at their college/dept., & only 8(5.93%) access the Internet from cyber café. Majority of the students of both the colleges access Internet from library. Comparison between PIET & SVIT maximum no. of students of SVIT use internet from the library. Maximum number of PIET's students access internet at home then the SVIT's students. Fig. 5 given here clearly shows that most of the students use Internet in library.

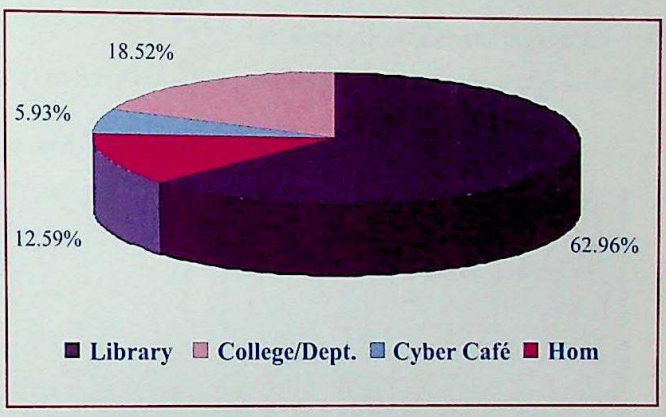

Fig. 5: Location of Internet Use by Students

Purpose of Internet Use

Purpose of Internet Use by Teachers

One of the major objectives of the study was to know the purpose of using Internet. The respondents of this study are using Internet for different purposes like for research, education, communication, entertainment, shopping things, improve subject knowledge, etc. The data on purpose of using Internet is analyzed and presented in the table 7 course wise.

Table 7: Purpose of Internet use by Teachers

Purpose	No. of Teachers												Total PIET+SVIT N=74
	PIET						SVIT						
	Electrical	Mechanical	Civil	Electronics	Computer	Total	Electrical	Mechanical	Civil	Electronics	Computer	Total	
Research	6	4	3	4	4	21	5	3	2	3	7	20	41 (55.41%)
Education	6	5	1	6	8	26	7	5	3	7	9	31	57 (77.03%)
Communication	6	3	2	4	4	19	4	3	1	3	6	17	36 (48.65%)
Entertainment	2	1	-	2	1	6	2	1	-	2	2	7	13 (17.57%)
Shopping things	-	-	-	1	1	2	-	1	-	-	1	2	4 (5.41%)
Improve subject knowledge	-	1	-	-	1	2	-	-	1	-	-	1	3 (4.05%)

Table 7 depicts that a majority of the respondents i.e. 57(77.03%) use the Internet primarily for education purpose, 41(55.41%) for research purpose, 36(48.65%) for the communication purpose, 13(17.57%) for entertainment purpose. Only 3(4.05%) of the respondents use Internet for improve subject knowledge and shopping things. Comparison of PIET; SVIT staff/teachers use Internet for education purpose. Only few students 2 of PIET & 1 of SVIT use Internet for shopping things. It is clearly shown in the fig 6.

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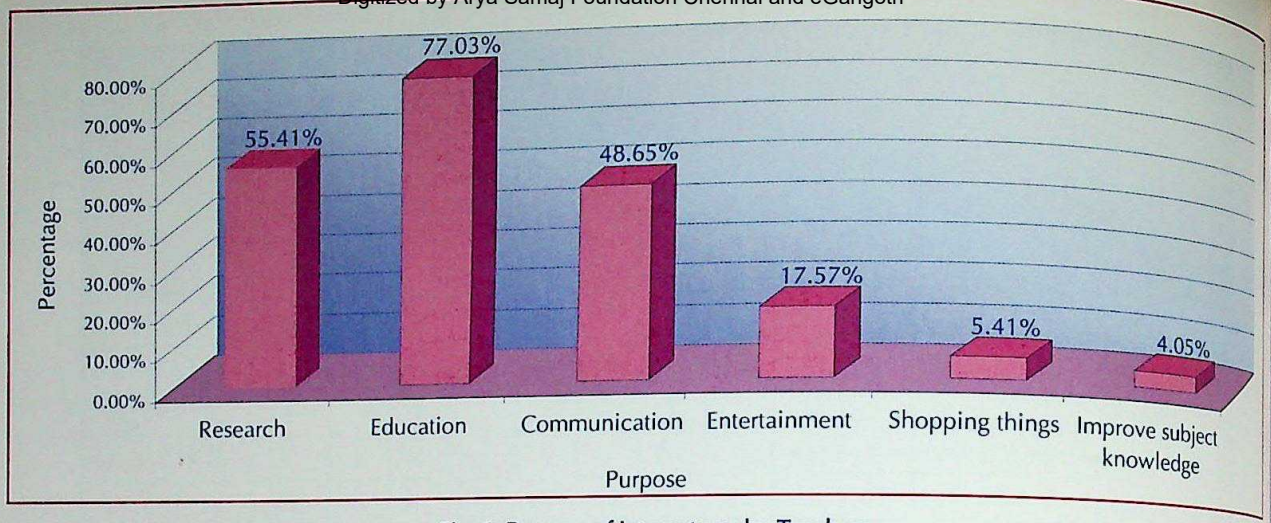

Fig. 6: Purpose of Internet use by Teachers

- **Purpose of Internet Use by Students**

The same data was collected from students and is analyzed and presented in the table 8.

Table 8: Purpose of Internet use by Students

Purpose	No. of Students												Total PIET+SVIT N=135
	PIET						SVIT						
	Electrical	Mechanical	Civil	Electronics	Computer	Total	Electrical	Mechanical	Civil	Electronics	Computer	Total	
Research	7	6	2	7	10	32	6	7	2	7	9	31	63 (46.67%)
Education	12	8	9	8	13	50	11	10	8	10	17	56	106 (78.52%)
Communication	8	7	5	8	10	38	7	9	5	8	10	39	77 (57.04%)
Entertainment	3	5	6	5	9	28	4	5	1	7	8	25	53 (39.26%)
Shopping things	1	1	1	-	1	4	1	1	-	1	1	4	8 (5.93%)
Audio / Video	2	4	3	-	2	11	2	3	1	2	2	10	21 (15.56%)
Improve subject knowledge	1	1	-	1	2	5	1	2	-	2	1	6	11 (8.15%)

Table 8 depicts that a majority of the respondents i.e. 106(78.52%) use the Internet primarily for education purpose, 77(57.04%) for the communication purpose, 63(46.67%) for research purpose, 53(39.26%) for entertainment purpose, 21(15.56%) for audio/video purpose, & 11 (8.15%) of the respondents use Internet for improve subject knowledge and shopping things. Only few students 8(5.93%) use Internet for shopping purpose. Maximum students of SVIT use Internet for education purpose then the PIET students. Majority of the PIET student use Internet for entertainment then the students of SVIT.

CONCLUSION

The Internet provides a great information on any subject field. Teachers and Students are using the Internet increasingly and it occupies an important place among various information sources. It is widely used by the academic community for their educational and research purposes and it plays an active role in searching of information. The information on the Internet is not usually available in an organized way and the users are unable to get precise information from the Internet. In order to make the Internet more beneficial, the library staff who have acquired a good deal of efficiency in the collection, organization and retrieval of information should feel duty bound to see that the users are able to obtain right information at the right time. Both the SFI Engineering Colleges selected under the study in which central library of both the colleges provide internet services to the Teachers and Students free of cost.

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Cyber Crime Prevention and Role of Libraries

Vinay Kumar D.

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Lecturer
DLIS
Kuvempu University
Jnana Sahyadri- Shimoga

Corresponding Author
Vinay Kumar D
vinay.86.kumar@gmail.com

ABSTRACT

The concept of cyber crime or cyber attack which was more known in the Western world is making its presence in developing countries like India. There has been an increase in Internet accessibility and in the last few years which could pose a serious problem for the Internet users. India is in a step forward to tackle the situation. In this context, the purpose of this paper is to review the current scenario of supportive issued to the increase in cyber crime in India and the probable attempts to prevent such crimes. This paper also emphasizes on the role of academic library in guiding its user community to prevent the white collar crimes.

KeyTerms: Cyber Crime, IAMAI, Cyber Crime Cells, Library Role, Information Technology Act, Information Security.

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INTRODUCTION

India is a fastest growing Internet using country in the world especially in Asia. Companies like BSNL, MTNL, Airtel, Reliance etc. are providing internet service at the competitive rates. 3G and 4G revolution in mobile phone industry brought internet access now on mobile phones at higher speed. The successive support from the Indian government to the application of broadband facility in mobile phones also results in the increased use of Internet.

The Internet usage momentum is not only from the side of desktop computers, it is also by the side of mobile internet users. Internet and Mobile Association of India [IAMAI] and market research leader IMRB reported that there were 46 million mobile Internet users in India in September, 2011, whereas, the number is increased to 143.2 million by March 2013. However, a total of 164.81 million net connections stand in India, Abudheen[1]. Along with the mobile Internet connections, the popularity of cyber cafes is also growing which has resulted in the increased use of Internet in India. India is a major market for Internet products and services in the 21st century. The growing information needs for various purposes encourage the use of Internet and www. The web itself has both advantages and disadvantages. The youth of India is attracted to Internet in general and social networking sites in particular in order to communicate, post personnel information to the larger audience.

The advantages of the Internet are all that people enjoy to access all kinds of information anytime from anywhere; transformation and expansion of trade and business, electronic governance, e-learning and education, research, entertainment, culture, etc. The disadvantages through Internet include hacking, email bombing, unauthorized access to email accounts, data altering, salami attacks (financial crimes), service attack (service blocker), trafficking, viruses / worm attacks, trojan attacks / unauthorized programme, fake emails internet time theft, web jacking, blackmailing, violation of privacy, indecent mailing, dissemination of obscene material, pornography, improper downloading of copyrighted material etc.

These harmful products of the Internet need to be included under the strong purview of the law, and need time to get sorted out. India is not exempted from the Internet crimes. The explosive growth of social networking sites in India, the rising popularity of mobile devices offering them and the ease of putting personal content on the Web have fuelled a rise in cyber stalking, fake profiles and offences that emerge on the pages social networking sites, Sharma[10].

As usage of the Internet continues to grow, and with it the realization that there exists countless individuals with the capacity and intent to use the medium to inflict damage, the world finds itself racing to secure legislation that will protect the incredible assets that are now stored online.

Highly populated countries in Asia like China, India are depended on web resources in order to compensate the

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mation requirements. On the other hand, it creates portunity to commit crimes in this platform. It is also highly ficult to detect and prevent Internet crimes in widely scattered working environment. In this regard Indian government strives ds in preventing the cyber crimes by enacting Information nology Act, 2000.

ROBABLE MEASURES TO PREVENT CYBER IMES

Cyber Laws and Information Security

ia passed the Information Technology Act 2000 in May 2000 notified it for effectiveness on October 17, 2000. The act has been amended in 2008 and presently known as IT endment) act, 2008 and was notified for enactment on ober 27, 2009. The sections 65-74 of the acts deal with the ishment for the cyber crimes.

Online Awareness Programs

rmation security awareness is provided through the web sites dia. Department of Information technology, Government of dia has launched a website to create awareness to the public, p://deity.gov.in/content/cyber-laws-security. Information urity awareness for children, students and parents has been vided through this website.

Cyber Crime Cells

ia has nine cyber crime cells actively working in Mumbai, ennai, Bangalore, Hyderabad, Delhi, Thane, Pune, Gujarat Gurgaon which involved in investigating the cyber attacks (as 2013).

Inclusion of Concept in the Syllabus

India education is growing sector. Computer education has en made compulsory in primary and higher education level. ough, there are 500 and more Universities and their stituent colleges imparting education in various disciplines, y little percentage of computer threat issues including rmation security issues were taught in Indian education tem, there is an urgent need of inclusion of information urity issues, cyber crime awareness courses in the curriculum colleges and universities.

Responsibilities of the Police Department

amendment) act, 2008 of India offers any police officer, not ow the rank of a Deputy Superintendent of Police, or any other er of the Central Government or a State Government horized by the Central Government to enter any public place o search and arrest without warrant any person found therein o is reasonably suspected or having committed or of mmitting or of being about to commit any offence. Police partment in this regard must be very clear about the suspects. o, they may conduct awareness programs to make public ernet crime literate[8].

Role of Media in Creating Awareness

dia could play an important role in terms of informing people computer crime exists and instilling an awareness of the ferent types of crimes. In India, there are more than 100 news annels broadcasting news in different languages. News annels are the major resource to spread the news to lay man. This could be the useful tool in creating awareness about the crimes committed over the web platform.

ROLE OF ACADEMIC LIBRARIES

Academic libraries are the one who subscribe e-resources in large number, Hadagali[4], Mulla[9]. At par with the e-resources, libraries are creating user databases, hold and maintain the catalogue database. These data should be secured from the unauthorized users of the library.

Students, teaching community, are highly depended on the e-resources which are subscribed by the institutional libraries. Users of the university and college libraries are involved in accessing large number of e-resources. Libraries are the sensitive place where user may face cyber attacks or might commit Internet crimes. It is the responsibilities of libraries to provide user education in relation with secure access to online information.

The following security measures should be followed in the libraries to protect huge amount of information. The same can be informed to the library users to protect the libraries from being attacked by cyber criminals.

- Not to create contact with strangers over the Internet
- Using updated antivirus software in order to protect the library data from virus, malwares.
- Knowing the sources of cyber crimes
- Not to share passwords and credit card details at the time of online transactions, if any.
- Taking up the regular data backups
- Use of firewalls
- Promoting user authentication methods (user name and password, biometrics) while providing access to library data.

The methods followed to protect valuable data and to prevent cyber attacks should be well defined and implemented in the library setup, Zimerman[11].

CONCLUSION

Internet access is gaining momentum in the information society. It also allows the criminals to commit crimes in the networked environment. Cyber crime is emerging as a serious threat. The governments, police departments and intelligence units have started to react to prevent this crime Gandhi[3]. Initiatives have been taken by the government departments to prevent the white collar crime. Cyber cells in the metropolitan cities of India have been established. They are actively involved in educating the people. Present day academic libraries along with the public libraries need to be conscious in this regard. Sources of the cybercrimes should be known and the same information should be transferred to the public of the society and students, teachers of the academic institutions, who spent huge amount of time over the Internet.

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Use of Collection and Services of Government Museum Research Library, Mathura (U.P.): A Case Study

Ramniwas Soni*, P.M. Gupta** and Mamta Mishra***

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*Sr. Library Information Assistant
IIT, Roorkee
**Dy. Librarian,
***Sr. Library Information Assistant
GLA University, Mathura

Corresponding Author
Ramniwas Soni
ram.niwas78@gmail.com

ABSTRACT

This paper presents an overview of Govt. Museum Mathura, Uttar Pradesh and its historical importance. This paper also gives a brief knowledge of the collection and services of its Library, naming Research Library. The main purpose of this study is to find out the present status of this Library and its services.

Primary data for this study has been collected through questionnaire and secondary data from the Library records. 50 questionnaires have been distributed to the users including Librarian of this Library.

Scope of this study is limited to the users of Research Library, Govt. Museum Mathura. On the basis of analysis of collected data, some suggestions /recommendations regarding user satisfaction and improvement of Library services have been suggested in this study. This paper can help the research scholars in getting the knowledge about Govt. Museum Mathura and its Library. Also can helpful in improving its services and status in this Information age.

KeyTerms: Museum, Mathura, Uttar Pradesh, Research Library, Information Age.

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INTRODUCTION

The term 'Museum' arises with the Greek word Mouseion, a place or temple devoted to the Muses , in Greek mythology of the arts. The Musaion, however, is also known as the great library of Alexandria which was established in the 3rd century AD and which provided the final resting place of Aristotle's famed library. The Musaion was in fact a place dedicated to muses and to study where one engaged oneself in noble disciplines. Early in the 3rd century BC, the great museum at Alexandria was founded by Ptolemy I Soter, with its college of scholars and its library[1]. The word museum was invigorated in 15th-century in Europe to describe the collection of Lorenzo de' Medici in Florence. Use of the word museum during the 19th and most of the 20th century represented a collection of cultural material to which the public had access. Later, the museum has been changed to represent the historic and artistic collection, open for public interest. With the present use of ICT application, the museum is now being digitized and virtualized.

MEANING OF MUSUEM

International Council of Museums defines a museum is a "permanent institution in the service of society and of its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment, for the purposes of education, study, and enjoyment".

The UK Museums Association definition[2] (adopted 1998) is "Museums enable people to explore collections for inspiration, learning and enjoyment. They are institutions that collect, safeguard and make accessible artifacts and specimens, which they hold in trust for Society"

GOVT. MUSEUM, MATHURA

Mathura is a religious and historical place. This holy city is birth place of lord Krishna, situated on the right bank of the River Yamuna at a distance of 145km to south-east of Delhi and 58 away from Agra, the Taj Mahal City. The Govt. museum of Mathura is a house of collection of ancient art & sculpture belonging more than 3000 years ago. This museum was set up by F. S. Growse[3] in the year 1874, after the celebration of its centenary in the year 1974 its name had been changed to Govt. Museum Mathura from its original name, 'Curzon Museum of Archaeology'.

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The worth visiting building of the museum is octagonal in shape and is made out of the red-sandstone. The museum has vivid and the most splendid collection of Kushana sculptures in the country. The Museum is the repository of the fine collections of stone sculpture and terracotta belonging to the Kushana period and and Gupta period. It has the largest collection of Kushana sculptures in the country[5]. Apart from that, the museum also has a marvelous collection of gold, silver and copper coins, clay seals, ancient pottery, paintings and bronzes among others. Few museums can boast of a better and a more varied collection of archeological material from one single region[6].

❑ Museums Holdings

Museum Holdings as on 01.04.2013

Sculptures	:	5099
Terracottas	:	2800
Bronzes	:	360
Pottery-bricks	:	293
Paintings	:	418
Ornaments	:	32
Sonkh objects	:	above12000
Others	:	1494
Coins		
Gold	:	178
Silver	:	5800
Copper etc.	:	18724

MUSEUM LIBRARY

With the growth of museum the need for a library was also felt. So, in 1930 a library cropped up and it was named as 'Research Library'. Here one thing is very important which should be cleared that the library as known "Research Library" is not only a research library. It equally welcomes general public also. So, it also allows to general public for only study but lending of books is available only for staff members of museum. People from far off places of U.P. and other states of India come over here to explore the inexhaustible mine of wealth hidden in this library. Not only Indian but foreigners also come here due to its significance.

COLLECTION

The collection of this library consisting of 40,000 books in Hindi & English languages on variety of subjects like history, culture art, architecture, religion, numismatics, philosophy etc. The library also subscribes to more than 10 periodicals. There are 19 maps also available in its collection. We can classify it's collection of books into three parts.

Table 1: Collection of Purchased Books

Code	Subject	No. of Books
A	Art and Architecture Sculpture	771
B	Paintings	232
C	Iconography	82
D	Numismatics	161
E	Epigraphy	262
F	History	1088
G	Archaeology	620
GA	Conservation & Preservation	36
H	Hindi Literature	1219
I	Sanskrit	1198
J	Culture & Philosophy	571
J1	Ethics	17
J2	Philosophy	203
J3	Religion	260
K	Geography	76
L	Guide Books	314
M	Dictionaries	244
N	Photography	235
O	Gazetters	169
P	Journals Asiatic Society of Bengal	201
Q	Asiatic Researches	17
R	Rupam:Quarterly an illustrated journal oriental art	11
S	Library Science	104
T	Journals	65
U	Miscellaneous	237
V	Foreign Languages	4
W	Museology	120
X	Decorative Art	95
Y	Census Reports	111
Z	Horticulture & Gardening	45
ZA	Catalogue	71
ZB	Tape Recording	22
ZC	Modern Architecture	17
ZD	Workshop	45
ZE	Music & Dance	100
ZF	Electric Lighting	3
ZG	Erotic Art, Sculpture &Sex	16
ZH	Biographies	27
ZI	Anthropology and social science	15
	TOTAL	**9084**

Second part is their manuscripts. It has a rich collection of manuscripts. The total number of manuscripts is 3825. There are two types of manuscripts available in the library one being paper and the other palm leaf. Mostly manuscripts are in Sanskrit language. There is one fumigation chamber available for preservation of manuscripts.

Third part of its collection is donated books. Its total collection is 27,091 books. These books are related to Hindi literature. In Research library these donated books are placed in a separate room.

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MEMBERSHIP

The library does not offer its membership to general public but they can visit the library for their research work only after obtaining the prior approval from the Director of the Museum but the library does not provide lending facility to them. This facility is available only for museum staff members.

LIBRARY SERVICES

The library provides the following services:

- Reference services
- Reading room facility
- Books lending facility
- Register catalogue
- Reprographic Services

OBJECTIVES

The main objective of this study is to find out the present status of the library and give some suitable suggestions for its further improvement in the collection and services for the benefits of the users.

Some other objectives are:

- To study the use of collection and services of Museum Library
- To identify the status of present staff.
- To identify the actual strengths & weakness of library resources & services.
- To identify the kinds of users and their needs.
- To identify the limitations or problems.

SCOPE OF THE STUDY

The scope of the study was limited to the users of Research Library (Govt. Museum, Mathura.

METHODOLOGY

Two types of questionnaire were prepared for this study. First one is for librarian and second one for users of the library. In this study, primary data have been collected through questionnaire and interview and secondary data from the records of the library, books and journals etc. A total of 50 questionnaires were distributed among the users and received back duly filed by the users with 100% response. The collected data was analyzed, tabulated, interpreted and presented in the form of tables and figures.

ANALYSIS AND FINDINGS

Analysis of the data collected from users has been presented here:

Status of the Users

Figure 1 shows that 54% of the visitors of this library are research scholars, 20% are retired persons, 14% are students and 12% are employed persons.

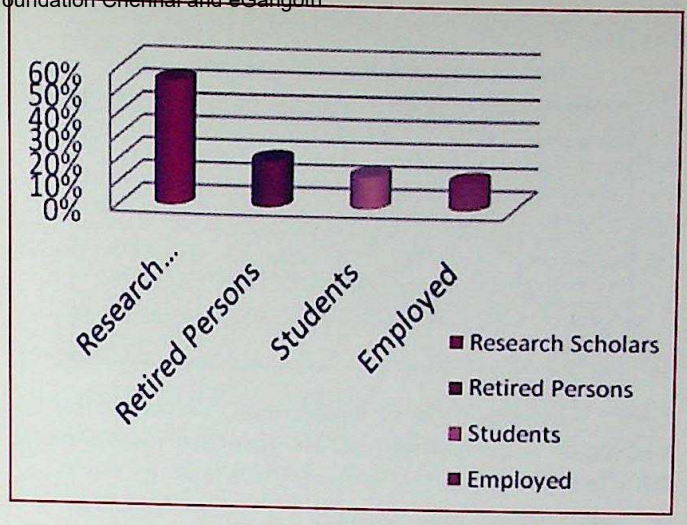

Fig. 1: Category wise Distribution of Users

Frequency of Library Visit

Table 2 indicates that out of 50 respondents 16(32%) visit the library first time, 13(26%) visit the library in a week and 9(18%) visit the library daily, 5(10%) visit the library fortnightly & monthly.

Table 2: Frequency of Library Visit

Frequency	No. of users	%age
First visit	16	32
Daily	9	18
Weekly	13	26
Fortnightly	5	10
Monthly	5	10
4 times/year	2	4
Total	**50**	**100**

Time Devoted

Figure 2 shows that 40% users spend 2-4 hours, 26% users spend 1-2 hours, 24% users spend 1/2-1 hours, 2% users spend less than 30 minutes in the Library. Only 8% users spend 4-6 hours in the library, and no users spend more than 6 hours in the library.

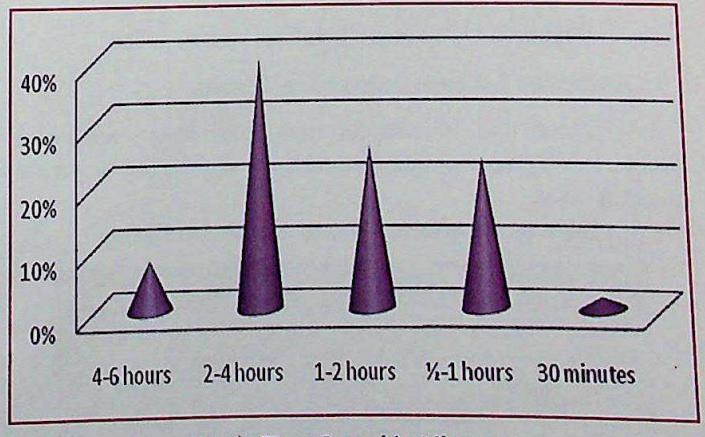

Fig.2: Time Spend in Library

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Accessibility of Reading Materials

Table 3: Accessibility of Reading Materials

Opinion	Respondents	%age
Not easy	8	16
Less easy	25	50
More easy	15	30
Extremely easy	2	4
Total	50	100

Table 3 shows that out of 50 respondents, 25(50%) said that the accessibility of the reading materials is less easy, 15(30%) found that it is more easy to access the reading materials.

Type of Library Materials Used

Table 4 reveals that out of 50 respondents, 24(48%) users visited the library for books related to their subjects and reference books, 16(32%) visited the library for reading of newspapers and magazines and only 10(20%) users visited the library for reading of government documents.

Table 4: Type of Library Materials Used

Type of Material	Respondents	%age
Subjects/ Reference books	24	48
Newspapers & Mag.	16	32
Govt. documents	10	20
Total	50	100

Photocopying/Reprographic Services

It is observed from figure 3 that majority of users i.e. (96%) are satisfied with the photocopy service of this library and only (4%) users are not satisfied.

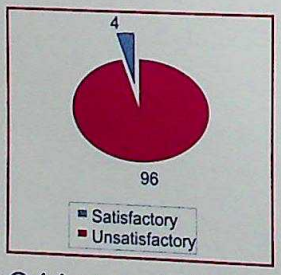

Figure 3: Opinion towards Photocopy Service

Awareness Towards Computerized Library

Table 5 shows that 34 (68%) of users of this library are aware about computerized or automated library and 16 (32%) are not aware about it.

Table 5: Awareness Towards Automated Library

Opinion	Respondents	%age
Yes	34	68
No	16	32
Total	50	100

Users' Opinion Towards Physical Facilities

Table 6 shows users' opinion regarding the physical facilities provided by the library to them. 96% of users indicate the reading room has adequate space with enough seating capacity. 100% users indicate that library has adequate space for browsing materials (popular magazines and newspapers). Majority (96% of users indicate that reading room has good ventilation and lighting facility. 72% of users say that library stack is not congested. 74% of users say that books on shelves are always organized.

Table 6: Users' Opinion Regarding Physical Facilities

Physical Facilities	Yes	No	Total
Adequate Space with Enough Seating Capacity	48(96%)	2(4%)	50(100%)
Adequate Space for Browsing Materials	50(100%)	0(0%)	50(100%)
Ventilation and Lighting	48(96%)	2(4%)	50(100%)
Library Stack is Congested	14(28%)	36(72%)	50(100%)
Shelving Arrangement	13(26%)	37(74%)	50(100%)

CONCLUSION

It is clear from the survey that users are satisfied from its collection that's why its importance for them is high but their satisfaction level is less due to less staff. The library has procured the software for computerization but there is no any professional staff working on it. Due to lack of funds and staff, the library is not able to improve the collection, services etc. A lot of things, which should be considered by the government and appropriate steps, should be taken for its further improvement in order to provide the best services to the users. As it is the very oldest library, therefore, it should be maintained by the government in the proper way so that the library could attract number of users and plays a vital role in their research work.

SUGGESTIONS

The following suggestions/recommendations are set forth on different aspects of research library of govt.museum, Mathura, on the basis of the study. These recommendations, if implemented, are likely to solve the existing problems and make the system more effective.

- There should be digitization of available manuscripts and rare books. So, that these valuable sources not only become the showcase item of the library but also become approachable information source also.
- There should be given a chance to research scholars for becoming the member of this library. So, that they can also borrow the books.
- There should be a website of this library & museum also. So that people from all over the world can be able to aware about its rare collection and able to utilize it. Like The Government Museum Chennai[7] and the Government Museum and Art Gallery, Chandigarh[8].
- Library management should take the guidance and support of The National Museum and Library Services Board, the

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advisory body for the Institute of Museum and Library Services, which is the primary source of federal support for the nation's 123,000 libraries and 17,500 museum[4].

Donated books also should be displayed properly. So that everyone can use them too.

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The title page should carry

1. Type of manuscript (e.g. Original article, Case Report, etc.)
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Journal

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Journal article from an Electronic Database

Krebs, D.L. & Denton, K. (2006). Explanatory limitations of Cognitive development approaches to morality. *Psychological Review*, 113(3), 672-675. Accessed on 20.04.2007, PsycINFO databse (2006-08257-012)

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Vasper, J., Haak, S. & Nikkhah, G. (2007). Subthalamic nucleus brain stimulation in elderly patients-analysis of outcome and complications. *BMC Neurology*, 7(7), 1-9. Accessed on 20.04.2007, http://www.biomedcentral.com /content/pdf/1471-2377-7-7.pdf.

Book

Damle, S.G. (2012). *Textbook of Pediatric Dentistry* (4th ed.). New Delhi: Arya (Medi) Publishing House.

Chapter from a Book

Rao, A.V.R. (2010). Human volumes in organizations: An additional exploration. In S.K. Chakraborty (Ed.), *Human volumes for Managers*, 136-147. New Delhi: Wheeler Publishing.

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While submitting a revised manuscript, contributors are requested to include, the 'referees' remarks along with point to point clarification at the beginning in the revised file itself. In addition, mark the changes as underlined or coloured text in the

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Cloud Computing Research Around the Globe in Different Universities: An Overview

Mayank Yuvaraj and Ajay Pratap Singh

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DLIS
Banaras Hindu University
Varanasi

Corresponding Author
Mayank Yuvaraj
mayank.yuvaraj@gmail.com

ABSTRACT

The first decade of the twenty-first century has not witnessed a world without ubiquitous and virtualized cloud computing power. The study analyses the pattern of research initiatives carried around the globe in different universities as well as briefly elucidates the notion of Cloud Computing(CC). The study will help the researchers to define their research problems and understand the concept at its optimum.

KeyTerms: Cloud computing, Cloud Computing Research, SaaS, PaaS, IaaS, Research Initiatives, Cloud Computing in Universities.

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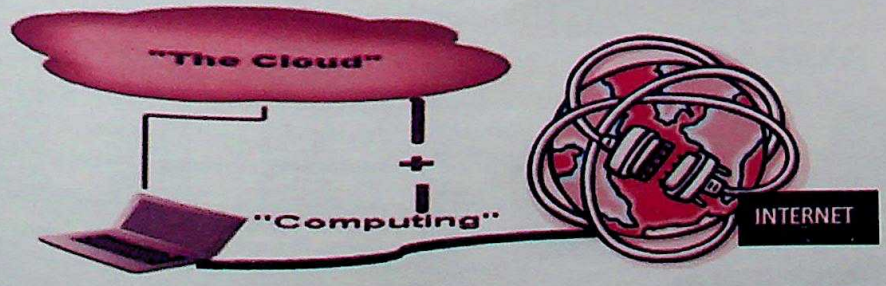
INTRODUCTION

Tremendous amounts of research effort have been devoted to studying different issues and problems of CC. Although, researchers have recognized CC as a legitimate area of research yet CC research is scattered across a wide range of disciplines and published sources. The present paper aims to provide an overview of CC research around the globe in different universities. Overall, researchers have addressed different issues and problems of CC as well as proposed many solutions, while some are still being investigated. Moreover, it is impossible to provide information about all the research activities that have taken place so far. So, avoiding any disingenuous labor we have put forth the concept as well as the relevant CC research initiatives carried out in universities.

CLOUD COMPUTING: DEATH OF HARDWARE

In the recent years Information Technology sector has witnessed technological turmoil in the form of thunders of CC. The concept CC has been defined as an integrated package of computing services and applications on web, offered as a utility ensuring throughout abstraction shown in figure 1. It provides an alternative to traditional computing where the operating systems, hardware and software are rented over the Internet. Unlimited ICT capacity and applications are offered as an online service through CC. Unlike traditional computing environment in a CC niche the cloud service provider looks after the resources such as: hardware, maintenance, updating, security, and other essential resources. The customer is independent of IT bothering and he has to only find the right services which can enable the customer to improve the computing performance. Although the concept was in use long time back but the term was formally announced by Google in 2010 which most of the scholars feel as a marketing strategy.

The environment of academic libraries has undergone a drastic change in the last few years. With the emergence of Internet era libraries are facing a big question to justify their services.



Cloud + Computing = Internet based computing

Fig. 1: Cloud Computing Concept

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Moreover, academic libraries have discovered a sharp fall in the number of gate counts as well as reduction in the circulation of traditional library materials. Some researches indicate that a rapidly growing percentage of the use of electronic resources occurs outside of the library. Where once students and faculty turned to libraries, they now turn to their personal computers, tablets or smart phones when they need to find information. Under such circumstances, CC is an approach to computing that could be worthwhile to academic libraries. Academic libraries can choose to how to get them connected to become a part of the cloud by opting from variations of software, systems, and hardware services. Whatever they choose CC could help the academic libraries save time, money and resources if servers and software were not needed on their premises as they are today. Hopefully libraries could focus more directly on services and materials for patrons if their computer hardware and software were handled by IT companies of the cloud. There are many reasons why CC is being common[16]. Technologically, we use CC because we can and it is convenient to use. Economically, it is cost effective and pocket friendly, and finally it makes interactivity easier to achieve with targeted audiences.

CHARACTERISTICS OF CLOUD COMPUTING

- Self-seeking on-demand service in cloud
- Wider accessibility to networks
- Metered service depending on the usage of cloud based services
- Flexibility or resiliency in cloud
- Pooling of resources available in cloud
- Virtualization of computers
- Green Computing
- Means to deliver IT to the end-users.

Flairs of Cloud Computing

Cloud Computing offers various services as shown in figure 2 which has been illustrated below:

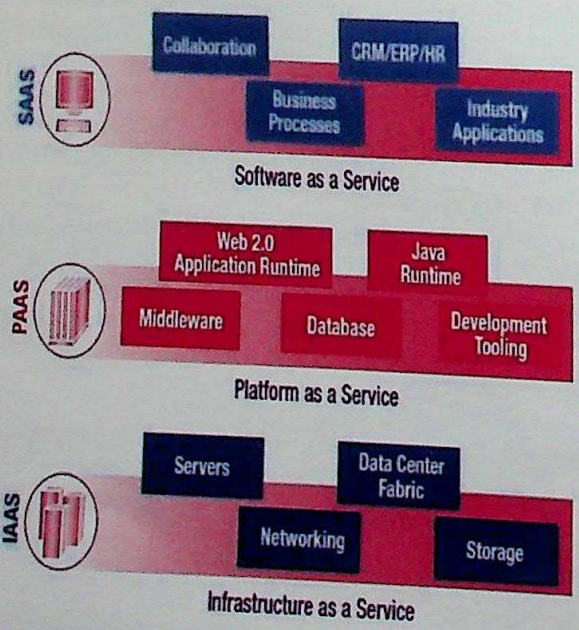

Fig. 2: Flairs of CC

Software as a Service (SaaS)

In SaaS model, the applications or software is delivered as a service to the end user, who can access the program online using a web browser or any other suitable users. SaaS services may be available on rental basis or on peruse basis. For example email and few other services offered by google, hotmail, yahoo, sify, skype etc. CC offers the ability of libraries to use online software to handle a task like video chat through gmail video chat or through skype[8]. Both of these are free services though there is little customization or control available with these applications[11]. Since the services and application interfaces are often familiar with users, it will decrease the learning curve for library staff and users[8].

Platform as a Service (PaaS)

In PaaS model, a computing platform supplies tools and a development environment to help organizations to build, test, and deploy Web-based applications. It helps organizations not to make investment in the infrastructure required for building Web and mobile applications, but can rent the use of platforms. PaaS is based subscription model so users only pay for what they use. Special platform or application infrastructure is also being provided to the clients. Moreover, client does not require knowing programming language, database management systems, etc. to run applications. Windows azure, google app engine and force.com are the finest examples of PaaS. Libraries can create applications in online environment where they can build, test, and deploy web based applications[11]. PaaS gives the library the freedom to explore development options without having to purchase and maintain the required infrastructure[8].

Infrastructure as a Service (IaaS)

In IaaS model, computer infrastructure is offered as a platform in a virtualization environment which can be used as a service along with raw storage and networking. IaaS is priced on a pay-as-you-go model enabling clients to scale up or down the operations depending on their needs at any given time and pay only for what they use. In the simple way, hardware services such as processors, memory, networks etc on agreed basis for specific duration and price. In IaaS, clients are being offered with storage, networking and processing of data. Amazon's Elastic Compute Cloud (EC2) or Simple Storage Service (S3), VMWare vCloud are some of its examples. By using IaaS, a library can purchase server space and computing power[8]. A library does not need to purchase a server which is underutilized but costs the same to purchase and maintain as if it were using all of its resources at all times. By using an IaaS, a library gains the benefit of only paying for the resources you actually use[14].

Any organizations can deploy CC applications on public, private, hybrid and community clouds model.

Craggs[6] has put forth the main categories of CC deployment:

- **The Public Cloud:** IT resources and services are owned by a third party, located off-premise and made available to anyone on a commercial basis as metered services.
- **The Community Cloud:** IT resources and services are owned and operated on behalf of a community of organizations.
- **The Private Cloud:** IT resources and services are owned/leased by a single company for its own use.

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- The Internal Cloud: A private cloud where all resources remain on-premise.
- The Hybrid Cloud: A combination of two or more cloud models.

Research Initiatives in Cloud Computing

Research initiatives are an inventory of research processes undertaken by various institutions to solve a research problem. Some of the notable research initiatives to the cause of CC is listed below:

Boston University (BU) Cloud Initiative, U.S.A.

Funded by National Science Foundation grants BU has taken initiatives in distributing/CC that aims to offer an open marketplace to independent, rational parties interested in setting up their own applications. They are exploring the competencies of Colocation Games[5] to develop an economically-sound framework upon which emerging cloud architecture could be implemented.

Carnegie Mellon University (CMU) Cloud Initiative, U.S.A.

CMU[6,1] is host to several CC research programs. CMU has joined hands with silicon valley based researchers to address the need for industry-wide, globally accepted measures for calculating the benefits and risks of CC services. Development of standards and measures to determine the cost, risks, quality and performance for CC services is also on top priority. Further, CMU in Qatar along with IBM (International Business Machines Corporation) is working on Cloud Computing Lab[4] (CCL) research initiative from 2009 to bring CC to the middle east. It focuses on performance analysis of scientific workloads, with regional relevance, on the cloud as well as solutions to overcome current limitations of the existing cloud paradigm.

Also, Intel Science and Technology Center for Cloud Computing[10] (ISTC-CC) has been formed as an open community to devise critical new underlying technologies for the cloud computing of the future. It is headquartered at CMU that includes researchers from GeorgiaTech, Intel, Princeton and UC-Berkeley. They focus on future clouds and its applications that is carved on four inter related pillars shown in figure 3.

Fig. 3: Focus Areas of Intel Science and Technology Center for CC

Researchers at CMU are using CC for multi-tier indexing of Web search engines. They are using CC to characterize the topicality of web content to more effectively process web searches. Routing searches topically requires less effort than traditional searches, enabling significant computational and financial savings. The project is using the Google/IBM cluster to 'crawl' the web and perform the data cleansing and pre-processing necessary to develop a web dataset of 1 billion documents to support the research. The web dataset is also being made available to the larger information retrieval community to multiply the impact of the project on that discipline.

Duke University (DU) Cloud Initiative

Funded by National Science Foundation in collaboration with NCSU, UNC Chapel Hill, and NCAT State University to explore and test Trustworthy Virtual CC Duke University has created a trustworthy virtual cloud super-computing environment for researchers. DUs Scalable Computing Support Center[2] has developed two options for CC:

- Private Duke Cloud, where researchers can purchase high-priority cycles as needed from a pool of machines and pay per CPU hour.
- Economy Cloud, where researchers can purchase low-priority cycles only, for a lower per CPU rate.

Researchers pool existing resources and share access to greater computing power than they could afford on their own, without worrying about the 'care and feeding' of the equipment, since DU provides the physical space, systems administration, programming assistance, power and cooling for the machines.

Florida International University (FIU) Cloud Initiative

FIU[7] researchers are leveraging CC to analyze aerial images and objects to help support disaster mitigation and environmental protection. Prominent researches carried in the CC domain include creation of a virtualized infrastructure systems and applications laboratory and Verification based Integrity Assurance Framework (VIAF).

Indian Institute of Technology (IIT) Cloud Initiative, Delhi

In India, IIT has played a pioneering role and is the earliest adopter of CC solutions. IIT Delhi has developed Baadal in 2011, which is an indigenously developed cloud orchestration and virtualization management software that can work with multiple virtualization technologies like KVM, Xen and VmWare. Further, IIT Delhi has commissioned ownCloud, a file and document sharing utility similar to the popular dropbox, for use by the IIT Delhi community. The utility supports storing and sharing of files, images, music and documents, contacts, calendar, tasks etc. It also supports version control and syncing with Windows/Linux/Mac desktops and Android and iOS based devices.

Baadal is still in its beta phase which is based on:

- 32 blade servers each with 2x6 core Intel(R) Xeon(R) CPU X5670 @ 2.93GHz and 16 GB RAM.
- 16 blade servers each with 2x4 core Intel(R) Xeon(R) CPU E5540 @ 2.53GHz and 12 GB RAM
- A 10Gbps ethernet backbone

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- 50 TB of virtualized storage based on a NetApp 3210V NAS and HP EVA6400 SAN with FC disks.
- Open source virtualization technology based on KVM.

Indiana University (IU) Cloud Initiative

The researchers at IU are working on several CC projects with grants from the National Science Foundation (NSF) and the National Institute of Health (NIH). Their research includes Large-Scale Distributed Scientific Experiments on Shared Substrate[15], Exploring the use of cloud techniques to overcome current medical computing obstacles such as long computation time and large memory requirements; and The FutureGrid project that will provide an experimental platform that accommodates batch, grid and CC.

Massachusetts Institute of Technology (MIT) Cloud Initiative

MIT[5] in collaboration with Yale University (YU)and the University of Wisconsin at Madison are working on comparative study of approaches to cluster-based, large-scale data analysis funded by NSF. In addition they are also independently studying CC Infrastructure and Technology for Education.

North Carolina Agricultural & Technical State University (NCATSU) Cloud Initiative

The team at the NCATSU is conducting research, funded by a NSF, in collaboration with NCSU, DU, and the University of NC at Chapel Hill to explore and test Trustworthy virtual CC.

North Carolina State University (NCSU) Cloud Initiative

NCSU and IBM have developed VCL (Virtual Computing Lab) shown in figure 4 to provide every student with most advanced educational resources. Through cloud infrastructure students will be provided accessibility to most advanced educational materials, select software applications and computing and storage resources.

The VCL solution allows users to remotely access a desired set of applications and environments over the Internet using a personal computer, laptop or mobile device from anywhere, at any time. To VCL users, even the most demanding software applications, operating systems and environments are easily accessible through license-honoring technology in a click of the mouse. Access is instant, and offers a range of options from single desktops to classroom-sized labs, to collections of servers and storage, to high-performance computing clusters.

Further, NCSU[13] is engaged in several CC projects funded by the NSF which includes two collaborative studies on Trustworthy Virtual CC and Hybrid Opportunistic Computing for Green Clouds.

Purdue University (PU) Cloud Initiative

The project at Purdue University is investigating linguistic extensions to MapReduce abstractions for programming modern large-scale systems, with special focus on applications that manipulate large, unstructured graphs. This will impact a broad class of scientific applications. Graphs have important utility in the social sciences (social networks), recommender systems, and business and finance (networks of transactions), among others. The specific case study targeted by the research is a comparative analysis of graph-structured biochemical networks and pathways which underlie many important problems in biology. They are also providing a CC testbed called Wispy to TeraGrid users.

Tsinghua University (TU) Cloud Initiative, China

TU[3] is the first prestigious university in mainland China to join Google's CC related programs and to work with Google on the offering of data processing courses and the research on CC. They have developed TU Cloud which is an all in one CC solution developed at the Grid Computing Division of TU in China that comprises of three components: Nova (virtual computation system: computing cloud), Carrier (distributed file system) and Corsair (distributed file manager based on carrier: storage cloud) which can be utilized independently or in combination.

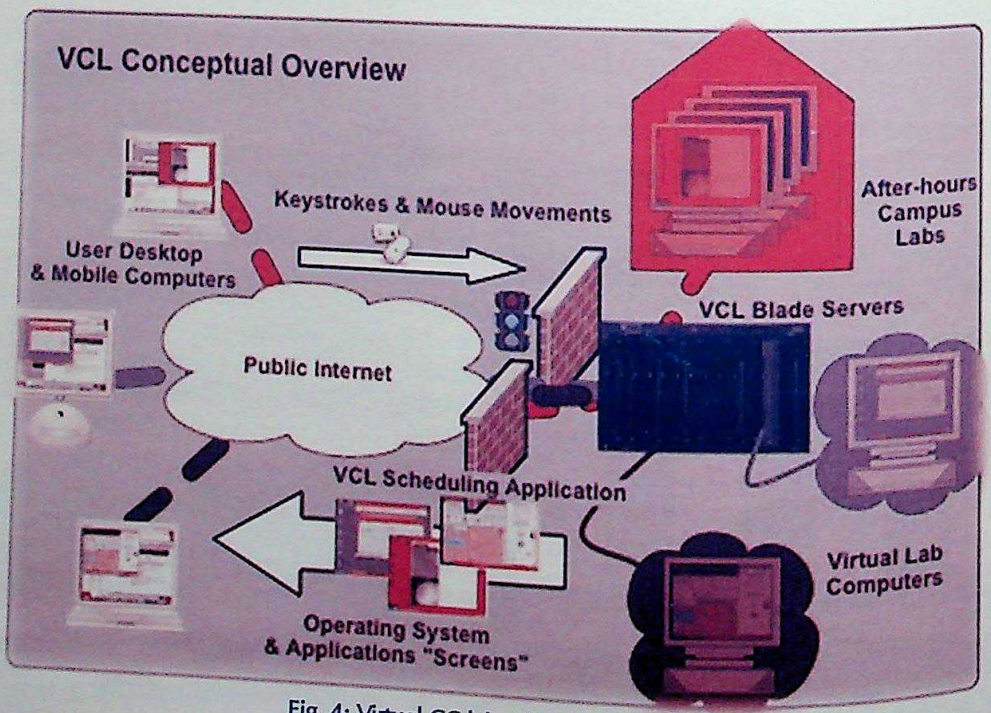

Fig. 4: Virtual CC lab of NCSU

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- **University of California (UC) Cloud Initiative, Irvine**

nded by NSF, UC Irvine[12] is working on a project to provide pport for efficient fuzzy queries on large text repositories in the oud. Supporting fuzzy queries can ultimately help applications igate their data quality issues because entities with different presentations can be matched for example 'PO Box' vs 'P.O. x'.

- **University of California (UC) Cloud Initiative, San Diego**

searchers at the UC, San Diego are studying how to manage d process massive spatial data sets on large-scale compute sters. This research will use the LiDAR topography data hosted OpenTopography as a test case and will focus on how CC can the management and processing of massive spatial data sets.

- **University of California (UC) Cloud Initiative, Sant Barbara**

he UC, Sant Barbara is actively pursuing several advancements CC. Their Massive Graphs in Clusters (MAGIC) project is cused on developing software infrastructure that can efficiently nswer queries on extremely large graph datasets. They have also signed an open-source implementation of the Google pfengine interface.

- **University of Maryland (UM) Cloud Initiative, College Park**

he research team at the UM, Cloud Computing Center at College rk is working on a range of projects funded by the NSF. They clude a Hadoop Toolkit for Distributed Text Retrieval, Data tensive Text Processing, Commodity Computing in Genomic search, and a series of other independent studies.

- **University of Massachusetts (UM) Cloud Initiative**

C research in University of Massachusetts involve the oogle/IBM cloud to learn more about world relationships which unded by NSF.

- **University of Melbourne (UM) Cloud Initiative**

he Cloud Computing and distributed systems laboratory at UM actively engaged in the design and development of next- neration computing systems and applications that aggregate or ose services of distributed resources depending on their ailability, capability, performance, cost, and users' quality-of- vice requirements. The lab is working towards realizing this ion through its two flagship projects: Gridbus and Cloudbus.

- **University of Minnesota (UM) Cloud Initiative**

searchers at UM are developing a cloud proxy network that ows optimized and reliable data-centric operations to be rformed at strategic network locations.

- **University of North Carolina (UNC) Cloud Initiative, Chapel**

In collaboration with NCSU, DU, and NCAT State University, searchers at the UNC are trying to explore and test trustworthy tual CC environment.

- **University of Utah (UU) Cloud Initiative**

e researchers[5] at the UU are working jointly with University of shington(UW) on building a new infrastructure for mputational oceanography that uses the Google/IBM cloud to ow ad hoc, longitudinal query and visualization of massive ean simulation results at interactive speeds.

- **University of Virginia (UV) Cloud Initiative**

The team at the UV is working on several CC projects funded by NSF. They include, feedback controlled management of virtualized resources for predictable escience and image super-resolution using trillions of examples.

- **University of Washington (UW) Cloud Initiative**

The researchers[5] at the UW are working jointly with University of Utah on building a new infrastructure for computational oceanography that uses the Google/IBM cloud to allow ad hoc, longitudinal query and visualization of massive ocean simulation results at interactive speeds. Further, their Astronomy Survey Group is conducting research to scale the sky with MapReduce/Hadoop.

- **University of Wisconsin (UW) Cloud Initiative, Madison**

The UW, Madison have designed the Hierarchically Redundant, Decoupled storage project (HaRD) to investigate the next generation of storage software for hybrid Flash/disk storage clusters. They are also working with MIT and Yale University (YU) on a comparative study, funded by a NSF CLuE grant (Cluster Exploratory Grant), of approaches to cluster-based, large-scale data analysis.

- **Wayne State University (WSU) Cloud Initiative**

Wayne State University is working on developing a unified learning approach, namely URL, to automate the configuration processes of virtualized machines and applications running on the virtual machines and adapt the systems configuration to the dynamics of cloud. Further, they have started Wireless health initiatives[17] that attempts at applying sensors, wireless communications and CC to healthcare applications.

- **Yale University (YU) Cloud Initiative**

The team at YU is working in collaboration with MIT and the UW at Madison on a comparative study, funded by a NSF, CLuE grant, of approaches to cluster based, large-scale data analysis.

CONCLUSION

Cloud Computing is being considered as the future of computing technology. From the study it is clear that there is an acute dearth of research initiatives in developing countries like India. Although it has many merits and is an end to painless works of updating, configuring and installing software educational organizations should look forward for CC solutions. The implementation of CC will not be succeeded if universities merely view as an online applications. Although, some of the universities have got discovery services, e-mail service on cloud and are further moving ahead step-by-step sharing resources among libraries however moving in patches to cloud is risky and not going to be fruitful in the long run. There is a need of proper training and plan well before introducing CC in the educational setup supplemented by well planned research initiatives.

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Developing Standards for Electronic Resource Management

Sanghamitra Pradhan

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DLIS
The Maharaja Sayajirao University of Baroda
Gujarat

Corresponding Author
Sanghamitra Pradhan
sanghamitrapradhan@rediff.com

ABSTRACT

The article brings out the deficiencies of the existing Integrated Library System (ILS) in handling the various challenges brought by extensive use of electronic resources and their management. It stresses the need for an exclusive Electronic Resource Management (ERM) system based on standards that would take care of solving issues relating to e-resource management. It reviews the efforts made by various agencies at different levels to address the challenges, developing standards and recommended practices for the ERM system in libraries.

KeyTerms: Electronic Resources, E-Resources Management, ILS, MARC, ERM System, ERMs Standards.

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INTRODUCTION

During the last two decades increasing use of electronic resources has made possible a paradigm shift in information provision, transforming libraries from the product provider to service provider through wider access. Electronic versions of information sources are undisputedly appealing, universally accessible and economically viable than their print counterpart. However, effective management of electronic resources is becoming a great concern for the libraries of today. First of all, to handle the growing electronic resources systematically one should understand the attributes of these resources. In common parlance although the term 'electronic resources' is used very simply it may be often wobbly. These can cover a wide variety of digital information sources ranging from simple ready to use CDs to complex databases, both in-house and the subscribed one, to a host of web resources and much more. Management of these resources requires some complex activities which were never felt before in a traditional print environment. Keeping track of varying access conditions, changing licensing terms and conditions, subscription and renewal dates, authentication, resource sharing negotiations, usage data collection, etc. are some of the challenges that libraries have to cope with managing e-resources. Nevertheless in an extremely erratic and increasingly complicated e-environment the existing ILSs are soon becoming inept in meeting these issues.

Electronic Resource Management (ERM) through ILS

Increasing use of electronic resources either through subscription or purchase presents proper management of a variety of administrative metadata before libraries such as subscriptions, licenses, and public access of these resources. To manage e-resources, libraries started using the ILS which has long been evolving and already operational in the libraries. But ILS is mainly designed to manage print resources and centered on bibliographic metadata describing the local collection. Here all the sub systems within the library would share common data and make it possible to develop separate cataloguing, acquisitions and circulation system databases, OPAC (Online Public Access Catalogue) and management statistics without duplication of efforts. The emergence of electronic resources and their excessive use in libraries made these systems inadequate to deal with as e-resources differ from print in the way they are acquired, accessed, and licensed. Soon the MARC (Machine Readable Catalogue) format, the traditional OPAC and acquisition systems found to be not suited for managing the ever-changing world of electronic resources[14]. Managing these resources is extremely demanding owing to the myriad challenges thrown upon by e-resources. The ILSs fell short of managing the magnitude of proliferation of electronic collections, the complicacy of access centered on these collections (OpenURLs, resolvers that link from citations to full-text and question-and answer services), the increasingly central role that these collections play in libraries, the huge budgets that are involved in their acquisition, the endless variation in the packages offered by the hundreds of players in the market (such as publishers, interface providers, and subscription agencies), the frequent changes in license terms and

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conditions, the complexity in local and remote authentication to access licensed content, and most importantly, the lack of suitable automated tools to deal with these complexities of e-resource management[8,9,10,14,15].

To exercise some control over their e-collections the libraries then started using multiple independent systems and data containers, which are often not integrated with each other. At one point of time even they used five to six systems to maintain their holdings: MARC 856 fields (tag with URLs) in the ILS to point to electronic journals, an external SQL/ColdFusion database for public users and spreadsheets for administrative information, license information, and statistics. Thus, as in the words of Gatenby[8] somewhere in the period 1998-2008, the ILS no longer merited its capital 'I' since it no longer integrated a library's processes in one system. Further these multiple systems are increasingly becoming expensive and cumbersome to maintain.

During the last decade there have been attempts to integrate the management functions relating to e-resources into a single package: ERM system for which open-source and usage-data standards are being developed. This single source of data then would uploaded to other systems and OpenURL resolves; allow wider access to the license data, and centralize the collection development decisions[9,5].

Building ERM into ILS Environment

ERMs are the latest batch of stand-alone modules mostly developed by ILS vendors and lately by e-journal management providers to manage electronic resources in libraries. ERMs can be integrated in the ILS system in two ways: just as a module to the existing set of modules in an ILS or can stand outside at any given ILS to act as the metadata licensing source to supply information about electronic resources into many other access tools such as OpenURL link resolvers, meta search mechanisms and discovery front-end modules[6]. However, an ERM system based on standards only has the power to integrate all management functions relating to e-resources such as subscription product names, descriptions, producer, license start and end dates, renewal alerts, images of contracts, price and payment terms, access URLs, user authentication, interface administrative URLs, verification access methods and restrictions, vendor contracts, contact history, usage statistics and links to usage reports, etc. into a single package. A good ERM relies increasingly on the effective uses of technology and adopts standardized procedures to sail over interoperability problem. Thus it is very crucial for the library to look for standardized tools when it is re-examining the architecture of its existing ILS to incorporate ERM system.

Developing Standards for ERMs

Setting of standard data elements in ERM system is very crucial for smoother integration of such systems into existing ILS. ERM system, designed with standard specifications, ensures smooth transfer of information from a vendor or an interface to a library, or between libraries, or migrated from one ERM product to another. Now libraries are offered to choose from a variety of ERM products mostly developed by ILS vendors and e- journal management providers. Even some open source solutions like CUFT, CORAL, ERMES, E-matrix, etc. are available. However, libraries find these unwieldy as many of these ERMs are non-standardized or even many lack essential features. Majority of ERM systems fail to resolve issues relating to workflow efficiency and, especially, interoperability with other systems although some other issues like license management and administrative information storage to some extent are addressed well. ERM systems are so far seemed to be a patchwork of standards2. Interoperability is the most knotty one among all the areas that need to be resolved for smooth integration of ERM system into ILS. Vendors develop ERM systems that fall short to correspond with different vendors (subscription agents and book providers) and different systems and records (acquisitions records, ERM records, MARC records, etc.) to support easy data transfer, automatic update of metadata like ISSNs and URLs and allow the export of data for its use in other applications within ILS system. Very little has been done to solve interoperability problem due to lack of standards. However, a review of literature on ERM standards reveals various efforts have been made to address the issue of developing technology and content standards for ERM mainly in the areas of communications management, license management, statistics management, administrative information storage, and acquisitions functionality and also in interoperability. In this paper an attempt has been made to highlight the developments in standardization of ERM system through a number of initiatives and projects for example DLF, ERMI, ONIX-PL, KBART, SUSHI, COUNTER, CORE, etc.

Digital Library Federation's (DLF) Electronic Resource Management Initiative (ERMI) has undertaken an important initiative in this regard via its two working groups, the ILS Discovery Interface Group and the Electronic Resource Management Initiative[4]. In August 2004, this task force produced a report resulting from its collaboration with libraries and major ILS vendors. The initiative's aim was to provide the library community with a set of specifications that would encourage the development of electronic-resource management systems based on standards and best practices. It would make possible interoperability of ILS and ERM system and ensure immediate improvement in data availability and reusability for managing e-collections throughout their life cycle and also for decision making in collection development. An increasing number of vendors are now developing ERM modules that can be either integrated into the existing ILS or stand-alone incorporating DLF ERMI specifications.

National Information Standards Organization (NISO) has been emerged as a pioneer player in developing standards for e-resources management which require urgent attention. NISO/UKSG Knowledge Base and Related Tools (KBART) initiative prescribes new possibility for OpenURL linking. OpenURL, which has now evolved into a formal standard (ANSI/NISO Z39.88), can improve the quality of OpenURL knowledge bases and their metadata[11].

Some other major initiatives taken in the area of licensing are worthy to mention. ONIX for Publication Licenses (ONIX-PL) provides a XML format for the communication of license terms for digital publications in a structured and substantially encoded form and designed to exchange licensing terms between publication vendors and libraries[13]. In this regard NISO's Shared E-Resources Understanding (SERU) also provides guidelines to libraries in case they want to forgo negotiated licenses without problem. This is possible because once the libraries and publishers join SERU registry they do not require any license to

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...ciate or sign at the time of placing order[12].

...king of usage data through the ERMs is another area which ...s also been standardized to a great extent. COUNTER's Codes ...Practice standardizes the usage data through an agreed ...ternational set of standards and protocols that govern the ...cording and exchange of online usage data[3]. Standardized ...age Statistics Harvesting Initiative (SUSHI) is another effort by ...SO to gather usage data from a large number of e-content ...pliers. By incorporating SUSHI standard now vendors are ...veloping ERM systems where usage data can be imported with ...s cost and managed properly. Further NISO's ongoing project ...veloping system related standards such as Cost of Resource ...hange (CORE), a communication protocol between ILS and ...M to address client problems[1].

...milarly, libraries that have developed their own ERM systems ...e either migrating data to systems developed by vendors or ...ing vendors take over the further development of their systems ...maintenance costs are increasingly high. A number of ...mmercial ERM versions such as Verde, Lagace, and Alma are ...signed by a leading vendor, Ex Libris that works with a range of ...rary systems[7]. These are products developed with ...laboration between vendors, Ex Libris and its customer ...raries. Ex Libris Alma, the latest project, is rule based and ...ows users to local workflow management. Its mechanism with ...ndardized tools helps in smooth integration of ERMs and the ...sting ILS infrastructure into a single system.

CONCLUSION

...M system, an important tool in re-engineering of ILS process, ...ly requires to be based on standard development and ...ctice. Given the challenges for ERM system, not a single ...mmercial, in-house or open source solution is currently ...ilable that can meet all the requirements in managing the ...y-gritty of e-resources on a regular basis. However, the future ...ms to be promising as DLF, ERMI and NISO have already set ...e groundwork for standards. NISO regularly conducts a gap ...lysis of ERM workflow to explore the need to develop new ...ndards and to bring out the implementation challenges and ...ommended practices for stakeholders. Succumbing to the ...ssures from the library customers, the system suppliers would ...initely implement the available standards: ONIX-PL, KBART, ...RE, COUNTER, SUSHI, SERU, etc. successfully into ERM ...ems. However, an effective and standardized ERM system is ...eved to build in coming years as a product of collaborative ...eavor of stakeholders: the libraries, the system vendors and ...subscription agents.

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Impact of Information Technology on Information Seeking Behavior of Sericulture Scientists

Khaiser Nikam* and Manjunatha J.**

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*Professor & Chairperson
**PhD Student
DLIS
University of Mysore
Mysore

Corresponding Author
Khaiser Nikam
khaiser.nikam6@gmail.com

ABSTRACT

This study attempts to investigate the impact of information technology on the information seeking behavior of scientists of Central Sericulture Research and Training Institute (CSRTI), Mysore, India. In this study questionnaire method was used for data collection. A total of 110 questionnaires were distributed to the Sericulture Scientists of CSRTI and 105 filled-in questionnaires were returned with an overall response rate of 95.45%. The findings show that highest numbers of scientists have awareness on using computer and its facilities for storing and retrieving information. The print copy of journal articles is given prime preference by most of the scientists. Effect of electronic dissemination of information on information gathering habit of scientists is very different compared to what it was in the last five years. Use of e-resources has very high impact on gathering and use of information and hence, the scientists find it very easy to use the information in their field. Nearly 72.4% of scientists spend 30 minute to 1 hour with in a day for searching information without taking anybody's assistance. Abstracting and indexing services are highly preferred library products and 67.62% of scientists are satisfied with the present library services at 75% level.

KeyTerms: Information Gathering, Information Seeking Behavior, Sericulture Scientists, CSRTI, LISA, LISTA.

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INTRODUCTION

Expansion of innovations in information technology has been changing the traditional information seeking behavior of users. Information technology like computer, Internet, digitization, multimedia, video conference, etc. have effected highly on users in accessing, storing, disseminating, and retrieving a variety of e-resources including e-journals, CD-ROM data bases, online databases, e-books, web based resources which are fast replacing the traditional resources of modern libraries[8]. The present study focuses on examining the impact of information technology on information seeking behavior of scientists of CSRTI, Mysore, India. The scientists at CSRTI are conducting basic and applied research in their discipline leading to the development of appropriate technologies for quality improvement. The disciplines are Soil Science, Agronomy, Mulberry Breeding and Genetics, Tissue culture, Mulberry Physiology, Mulberry Pathology, Silkworm Genetics, Molecular Biology, Silkworm Pathology, Silkworm Breeding, Silkworm Physiology, Seed Technology, Bioinformatics. Therefore, explicitly understanding of impact of information technology on information seeking behavior of scientists is necessary for providing effective library services and to assist the library users in fulfilling their information requirements.

LITERATURE REVIEW

The literature review of previous studies on the impact of information technology and information seeking behavior of scientists shows that the use of e-information is an important component of research activities and Internet is the most preferred medium for accessing e-information on common platform, i.e. World Wide Web (www) for physical science scientists, social scientists[5,6]. Many studies reported that E-mail is extensively being used by biomedical scientists and law professionals1[4,15]. Similarly, CD-ROM is most utilized IT based information sources for biomedical scientists[15]. Swain[7] Identified that user of business school most frequently use Google

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Yahoo search engines for accessing e-resources on internet. Singh[4] found that PhD scholars in Physicists, Astronomy, Astrophysics, Atmospheric Physics and condensed matter and Materials Physics use e-journals for keeping up-to-date with the developments in their field. Physicists in high energy Physics mainly depend on e-print archive and physicists of optical science laboratory use e resources for tracking references, attending conferences and receiving table of contents, e-mail alerts to keep up-to-date in their field. It is found from the previous studies that there are no studies on the impact of IT on Sericulture scientists, hence this study is carried out[7, 12].

OBJECTIVES

- To examine the awareness of use of IT on accessing information.
- To find out the significant changes of communication behavior.
- To examine the impact of electronic sources on the use of information and its storage and retrieval.
- To investigate what types of library services are preferred by these scientists.
- To understand the level of awareness of various services offered by the library.

METHODOLOGY

The main purpose of the study is to survey the scientists of CSRTI, Mysore, India and to examine the impact of information technology on information communication behavior of the scientists of CSRTI, Mysore. Survey research method is used for data collection. A structured questionnaire with five point scale to represent the parameters in the questionnaire is used. Total population of 110 scientists is used as the sample, hence 110 questionnaires were administrated and 105 filled-in questionnaires were received with an overall response rate of 95.45%. The sample was drawn from the 25 sections of CSRTI, which in turn belong to 4 main division of CSRTI such as sericulture division (7 sections), sericulture division (11 sections), SEEM division (3 sections) and training division (4 sections). All these division have 110 scientists of various grades. Statistical (SPSS) package was used for analysis of data. Where ever necessary averages and mean were used for interpretation of tables and to express the outcome of the study. LISA and LISTA database were used to do the review of literature.

RESULTS AND DISCUSSION

The results and discussion of the present study are as follows:

Age vs Gender Cross Tabulation

Table 1: Scientists Age vs Gender

Age	Gender		Respondents	%age
	Male	Female		
20-30	1	0	1	1
30-40	0	4	4	3.8
40-50	26	14	40	38.1
50-60	55	3	58	55.2
60-70	2	0	2	1.9
Total	84	21	105	100

The age vs Gender cross tabulation is shown in table 1. It may be seen from the table that majority of scientists 80% are male and the rest 20% are female. It may also be seen that nearly 96% of the male respondents are in the range 40-60 years of age, where as, 67% of the female respondents are in the age group of 40-50 years.

Educational Qualification

Table 2: Educational Qualification

Qualification	Respondents	%age
Ph.D.	70	66.7
Post Graduate	35	33.3
Total	105	100

The educational qualification of the respondents is shown in table 2. It may be seen from the table that nearly 66.7% of the respondents possess doctorate in their area of work and 33.3% of them are post graduates in sericulture and other related disciplines.

Present Assignment

Table 3: Present Assignment

Assignments	Respondents	%age
Basic research	61	58.05
Teaching	9	8.6
Undergoing training	1	0.95
Basic research and training	34	32.4
Total	105	100

The present assignment in which the respondents of CSRTI are engaged is shown in table 3. It may be seen from the table that a large number of scientists, representing 61(58%) are involved in basic research, about 34(32.4%) of them are engaged in basic research and training, 9(8.6%) of them are purely engaged in teaching and only 1(0.95%) scientist is undergoing training.

Extent of Use of IT among CSRTI Scientists

Table 4: Extent of Use of Information Technology among CSRTI Scientists

Information Tools	Never (0)	Rarely (1)	Occasionally (2)	Frequently (3)	Most Frequently (4)	Mean Value
Computer and its Facilities	3 (2.86)	5 (4.76)	16 (15.24)	25 (23.81)	56 (53.33)	3.2 (1)
Internet/ Intranet, etc.	22 (20.95)	8 (7.62)	10 (9.52)	33 (31.43)	32 (30.48)	2.43 (2)
Photocopying	22 (20.95)	11 (10.48)	12 (11.43)	30 (28.57)	30 (28.57)	2.33 (3)
Telecommunication facilities	21 (20)	8 (7.62)	18 (17.14)	39 (37.14)	19 (18.10)	2.26 (4)
Multimedia	35 (33.3)	5 (4.8)	17 (16.19)	39 (37.14)	9 (8.57)	1.83 (5)
Microforms	42 (40)	13 (12.38)	19 (18.10)	24 (22.86)	7 (6.67)	1.44 (6)
Video Conferencing/ Video text/ Tele text	51 (48.57)	21 (20)	25 (23.81)	4 (3.81)	4 (3.81)	0.94 (7)
Digitization	60 (57.14)	16 (15.24)	14 (13.33)	12 (11.43)	3 (2.86)	0.88 (8)

The extent of use of the IT facilities by the scientists is shown in table 4. It may be seen from the table that the use of computers and its facilities ranks first with a mean value of 3.2. This is

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followed by internet/intranet mean value 2.43, photocopying mean value 2.33 and telecommunications facilities mean value 2.26. Some other IT facilities which are occasionally used are multimedia mean value 1.83, and microforms mean value 1.44. However some facilities like video conferencing, videotext, teletext mean value 0.94, and digitization mean value 0.88 are rarely used.

❑ Preferences to Obtain Journal Articles

Table 5: Preferences to Obtain Journal Articles

Preferences	Never (0)	Rarely (1)	Occasionally (2)	Frequently (3)	Most Frequently (4)	Mean Scores
Print copy	11 (10.48)	10 (9.52)	17 (16.19)	48 (45.71)	19 (18.1)	2.51 (1)
Free/Open Access Journal	21 (20)	9 (8.57)	17 (16.19)	36 (34.29)	22 (20.95)	2.28 (2)
Print & Electronic	27 (25.71)	13 (12.38)	27 (25.71)	24 (22.86)	14 (13.33)	1.86 (3)
Via e-mail from the author	25 (23.81)	21 (20)	26 (24.76)	24 (22.86)	9 (8.57)	1.72 (4)
Trough Document Delivery Services	37 (35.24)	23 (21.9)	22 (20.95)	22 (20.95)	1 (0.95)	1.3 (5)
Paid Open Access Journal	44 (41.9)	20 (19.05)	23 (21.9)	15 (14.29)	3 (2.86)	1.17 (6)
Other	89 (84.76)	9 (8.57)	6 (5.71)	1 (0.95)	0 (0)	0.23 (7)

The preferences of scientists to obtain journal articles and other reference materials for research are shown in table 5. It may be seen from the table that the scientists prefer print journal most mean value 2.51, followed by free/open access journals mean value 2.28 and both print and electronic mean value 1.86. The need to obtain journal articles via-e-mail from the authors mean value 1.72 ranks fourth. The preference to get journal articles through document delivery services mean value 1.3 ranks fifth.

❑ Use of e-Journals Now and Earlier and Information Gathering Habits

Table 6: Use of E-Journals and Information Gathering Habits

Impact of Use of e-Journals	Never (0)	Rarely (1)	Occasionally (2)	Frequently (3)	Most Frequently (4)	Mean Scores
Very Different	2 (1.90)	15 (14.29)	25 (23.81)	51 (48.57)	12 (11.43)	2.53 (1)
About the Same	24 (22.86)	41 (39.05)	23 (21.9)	15 (14.29)	2 (1.9)	1.33 (2)

The use of e journals now and earlier by the scientist and their impact on information gathering habits is shown in table 6. It may be seen from the table that majority of scientists mean value 2.53 have been using very different e-journals now than what they were using five years ago mean value 1.33.

❑ Impact of IT on the Scientists in Gathering and Use of Information

The impact of IT on the scientists in gathering and use of information and in what capacity is shown in table 7. It may be seen from the table that a majority of scientists find the use of e-journals easier to gather information and use mean value 2.92 followed by about the same amount of time on information gathering with or without e-journals mean value 1.23. It takes more time to gather and sort through information mean value 0.59 ranks third. There is too much information to sort through efficiently ranks fourth with a mean value of 0.49.

Table 7: Impact of IT on the Scientists in Gathering and Use of Information

Impact of IT	Never (0)	Rarely (1)	Occasionally (2)	Frequently (3)	Most Frequently (4)	Mean Scores
Easier	8 (7.62)	0 (0)	15 (14.29)	51 (48.57)	31 (29.52)	2.92 (1)
About the same	48 (45.71)	16 (15.24)	19 (18.10)	13 (12.38)	9 (8.57)	1.23 (2)
More difficult	64 (60.95)	24 (22.86)	13 (12.38)	4 (3.81)	0 (0)	0.59 (3)
Much more difficult	74 (70.48)	18 (17.14)	7 (6.67)	5 (4.76)	1 (0.95)	0.49 (4)
(For what purpose)						
Photocopying / Retrieval of articles	30 (28.57)	11 (10.48)	35 (33.33)	21 (20)	8 (7.62)	1.68 (1)
Searching for relevant information using scientific databases	30 (28.57)	18 (17.14)	31 (29.52)	23 (21.9)	3 (2.86)	1.53 (2)
Learning about current trends in the field	32 (30.48)	27 (25.71)	33 (31.43)	11 (10.48)	2 (1.9)	1.28 (3)
Synthesizing scientific information into reports	46 (43.81)	15 (14.29)	25 (23.81)	14 (13.33)	5 (4.76)	1.21 (4)
Verifying facts	53 (50.48)	18 (17.14)	24 (22.86)	10 (9.52)	0 (0)	0.91 (5)
Verifying citations	76 (72.38)	10 (9.52)	18 (17.14)	1 (0.95)	0 (0)	0.47 (6)

The majority of scientists who have accepted e-resources as it helps them to take photocopying articles mean value 1.68 and searching for relevant information using scientific databases mean value 1.53. The scientists also use IT for learning about current trends in the field mean value 1.28, synthesizing scientific information into reports mean value 1.21, verifying facts mean value 0.91 and verifying citations mean value 0.47.

❑ Use of Databases

Table 8: Use of Databases

Use of Databases	No of Responses	%age
Agris	48	45.7
Biological Abstracts	63	60
Biotechnology Abstracts	27	25.7
Seris-Sericulture Information System	74	70.5
Seridoc	11	10.5

The CSRTI library has been providing full text database services to scientists and using its own database called Seris Sericulture Information System. The table 8 reveals that majority of scientists use Seris 74(70.5%) followed by Biological Abstracts 63(60%), Agris 48(45.7%), Biotechnology Abstracts 27(25.7%) and Seridoc 11(10.5%).

❑ Opinion about Amount of Time Spend on Information Gathering

Table 9: Opinion about Time Spend on Information Gathering

Time spend on information gathering	Never	Rarely	Occasionally	Frequently	Most Frequently	Mean Ranking
No trouble in managing time	11 (10.48)	17 (16.19)	30 (28.57)	39 (37.14)	8 (7.62)	2.92 (1)
Not enough time	22 (20.95)	22 (20.95)	42 (40.00)	15 (14.29)	4 (3.81)	1.59 (2)
Some trouble in managing time	51 (48.57)	30 (28.57)	16 (15.24)	8 (7.62)	0 (0)	0.82 (3)

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The table 9 shows that the majority of scientists said that they do not have any trouble in managing time for information gathering mean value 2.15. The second largest groups of scientists mean value 1.59 said that they do not have enough time for the purpose of gathering information followed by those scientists mean value 1.32 who have some trouble in managing time for information gathering.

2. Time Taken to Find the Needed Information Independently

Table 10: Time Taken to Find the Needed Information Independently

Hours	Within a day	Within a week	Within a month	Over a month
1hr to 1hr	72.4%	31.4%	12.4%	1.9%
1hr to 2hr	15.2%	44.8%	30.5%	31.4%
2hr to 3hr	3.8%	6.7%	16.2%	10.5%
3hr to 5hr	6.7%	9.5%	14.3%	9.5%
5hr to 7hr	1.9%	6.7%	18.1%	23.8%
7hr to 10hr	0%	1%	8.6%	22.9%
Total	100	100	100	100

The table 10 illustrates the amount of time taken by the scientists to search the information on their own. Nearly 72.4% of scientists spend 30 minute to 1 hour with in a day for searching information. This is followed by those, who spend a week or a month or over month, taking 1 hour to 2 hours per day to find the information on their own which representing 44.8%, 30.5% and 31.4% respectively.

3. User Preferences towards Library Services of CSRTI

Table 11: User Preferences towards Library Services of CSRTI

Information services	Poor	Satisfactory	Good	Excellent	Mean
Abstracting/ Indexing services	3 (2.86)	12 (11.43)	53 (50.48)	37 (35.24)	2.18 (1)
Circulation	12 (11.43)	15 (14.29)	59 (56.19)	19 (18.10)	1.81 (2)
Newspaper clipping services	30 (28.57)	20 (19.05)	41 (39.05)	14 (13.33)	1.37 (3)
Database/OPAC	31 (29.52)	19 (18.1)	43 (40.95)	12 (11.43)	1.34 (4)
Search browsing	42 (40)	7 (6.67)	38 (36.19)	18 (17.14)	1.3 (5)
Reference services	34 (32.380	19 (18.1)	41 (39.05)	11 (10.48)	1.28 (6)
Content page service	36 (34.29)	16 (15.24)	49 (46.67)	4 (3.81)	1.2 (7)
Display board service	45 (42.86)	12 (11.43)	44 (41.90)	4 (3.81)	1.07 (8)
Inter Library Loan	42 (40)	21 (20)	37 (35.24)	5 (4.76)	1.05 (9)
Reprographic	43 (40.95)	17 (16.19)	42 (40)	3 (2.86)	1.05 (9)
Technical enquiry services					

The preferences of scientists towards CSRTI library services are presented in table 11. It may be seen from the table that of all the services, abstracting and indexing service is most preferred by the respondents with a mean score of 2.18. Circulation service is preferred next with a mean score of 1.81. This is followed by news paper clippings service mean value 1.37, Database or OPAC service mean value 1.34 and references service mean value 1.3. Content page services mean value 1.28, display board services mean value 1.2, reprographic services mean value 1.05 and technical enquiry services mean value 1.05.

FINDINGS AND CONCLUSION

Present study is an attempt to find the impact of information technology on the information seeking behavior of a special group of scientists in the discipline of sericulture. These scientists are attached to an institution that is called as CSRTI, located in Mysore, Karnataka, India. The study was carried out to fulfill the five main objectives and using survey research and five point scales. Structured questionnaire is the tool used for data collection.

The findings show that majority of scientists are male 80%. Nearly 66.7% of the scientists are PhD holders. About 58.05% respondents are engaged in basic research in sericulture. All the IT facilities, computer use is valued most with a mean of 3.2 and least used in digitization with a mean of 0.88. It is observed that sericulture researchers still prefer print journals over e-journals with a mean of 2.28 and the least preferred are paid open access journals mean value 1.17. Compared to what they were using five year ago, it is seen that they have taken to e-journals mean value 1.33 to some extent. The impact of IT is more on the use of e-journals mean value 2.92, and they find it easier to gather information through them. An institution database called Seris is preferred most 70.5% compared to other data base like Seridoc 10.5%.

It is also found that, the scientists do not have any trouble in managing time for gathering information. Nearly 72.4% of the respondents spent 30 minutes to 1 hour per day for information gathering. Abstracting and indexing services is the most preferred service with a mean value of 2.18. Thus the use and application of IT on information gathering habits of sericulture scientists is positive nature.

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Information Literacy among Faculty and Students of Postgraduate Institute of Medical Education and Research, Chandigarh and Pt. B. D. Sharma University of Health Sciences, Rohtak

Suman Lata* and Sanjeev Sharma**

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*Research Scholar
**Assistant Professor
DLIS, Kurukshetra University
Kurukshetra

Corresponding Author
Suman Lata
sharma_suman77@rediffmail.com

ABSTRACT

Information literacy (IL) is recognized as an important aspect of medical education. Information retrieval and critical appraisal of information have become important because medical education standards require medical students and residents to possess those skills. The present study is an attempt to know the IL skills of the faculty and students of Postgraduate Institute of Medical Education and Research, Chandigarh and Pt. B.D. Sharma University of Health Science, Rohtak. The study was based on the data collected through questionnaires. All the respondents were able to specify their information needs. A majority of the faculty and students rated their skills high in accessing information in print and electronic format. For evaluating information in print format most of the respondents rated their skills very high whereas in electronic format most of them rated their average skills. In comparison to students, the faculty members of both the medical colleges were more familiar with the bibliography. A very small percent of the respondents of both the medical colleges were familiar with the Boolean operator OR.

KeyTerms: Information Literacy Skills, Information Competence, IndMed, MedIND, ScienceDirect, Scopus, ProQuest.

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INTRODUTION

With the recent developments in Information and Communication technologies and globalization of information it is easier for individuals to access information from anywhere and at anytime[1]. Proliferation of information in varying forms, formats, and the amount has made the contemporary era information intensive with manifold choices to access and retrieve information. However, this requires the skills to exploit the best choice among the myriad. Furthermore, the current scenarios mystify users evaluating the quality and authenticity before they consume information. All these intricacies pose challenges for individuals in accessing and retrieving information efficiently, sifting and evaluating its authenticity, validity, and reliability for its effective use. Here arises the need for IL, which ensures critical thinking and discernment about the whole gamut of information and its varying formats, prior to its consumption[2]. It is the competency that empowers one with the required knowledge about information, its nature and available formats, skills to fetch the relevant information by sifting the irrelevant, and attitude for consuming and sharing information, by ethical means and practices. IL can play a vital role in educating the users of libraries on various information and documentary resources, where to start searching for information, what, where and how to access them and compare retrieved information and how to communicate their information[3].

NEED OF INFORMATION LITERACY

As far as the medical profession is concerned, medical professionals have lack of time due to their hectic schedule. They have to spend most of their time treating patients and research. Apart from this, there is indeed an immense increase in the medical literature appearing year after year, and day after day. Due to the rapid growth of medical literature in various forms and formats, it is not feasible for them to find the relevant information in a very short span of time. In such a situation, they must have IL

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skills. IL is recognized as an important competency in medical education. The Association of American Medical Colleges Report on Learning Objectives for Medical Education states that physicians must possess the ability to retrieve from electronic databases and other resources, manage and utilize biomedical information for solving problems and making decisions that are relevant to the care of individuals and populations[4]. Therefore, it is necessary to study the IL skills of students and faculty of two prominent medical colleges of Haryana and Chandigarh.

PROFILE: PGIMER & PBDSUHS

The Postgraduate Institute of Medical Education and Research (PGIMER) of Chandigarh was started in 1962. The Institute was originally under the Government of undivided Punjab. After the reorganization of the state, the administrative control of the institute passed on to the Union Territory of Chandigarh in November 1966. The Institute became an autonomous body under the Act of Parliament in 1967 functioning under the Ministry of Health and Family Welfare, Government of India. The PGIMER of Chandigarh is an institute of national importance which has achieved excellence in providing high quality patient care, medical education and research[5]. The medical college of Haryana is well known as Pt. B. D. Sharma, Post Graduate Institute of Medical Sciences (PGIMS), Rohtak which was started under the name of Medical College in the year 1960. It is a major institution of the region for medical education and research and a care centre of specialized health care services. In the year 1994, Medical College, Rohtak was renamed as Pt. B. D. Sharma Medical College, Rohtak and subsequently it was upgraded to a Post Graduate Institute of Medical Sciences (PGIMS) in the year 1995. On 2nd June, 2008, it was upgraded to a State University and now known as Pandit Bhagwat Dayal Sharma University of Health Sciences (PBDSUHS), Rohtak[6].

LITERATURE REVIEW

A large number of research studies have been conducted on assessing IL skills. Baikady[7] conducted a study on the medical faculty and students of six medical colleges of Coastal Karnataka in order to assess their computer literacy skills in the use of web resources and found that 76.1% of the faculty members and PG students who had expert computer literacy skills used the web resources such as Pub Med, and Medline databases frequently while the faculty and PG students who had above average computer literacy skills used web resources less frequently. To gain a better understanding of the IL skills of the PG students in the use of e-resources. Kishore[8] conducted a study on under the title IL skills of the PG students towards the use of electronic information resource. The study results revealed that 65% of the postgraduate students rated their computer literacy level average while 16.25% rated their computer skills below average. For searching relevant articles 52.5% of the students gave first preference to the Medline database while second preference was given to PubMed database by 33.12% of the students. Moghadda szaden[9] carried out a study on faculty members and research scholars and found that the 20 respondents were able to express their information need and their mean score was 14.56 whereas 24 respondents were able to identify different types of potential sources for information with 16.48 mean scores. The attitude of the respondents towards nature and extent of information needed was 59.12 out of 90. Towards access to information, the mean score was 61.76 out of 88, and towards evaluation of information was 70.52 out of 100 respondents. Nosrat[10] explored the IL competency of M.A. Students in Tarbiat Moallem University of Iran. The findings showed that the students' IL competency mean for recognizing their information need was 3.65, for being acquainted with information resources and databases 2.7, for information search strategy 3.05, for information retrieving 2.87 and for assessing and evaluation information IL competency mean were 3.02. A study on IL Skills of Engineering Students and found that only 16.30% of the respondents chose the correct Boolean operator OR to get more search results[1] 81.8% were not aware of the use of a thesaurus in search for preferred terms for a particular database. 26.5% of the respondents were familiar with the usefulness of encyclopedia in providing an overview summary of a topic[11].

OBJECTIVES

The purpose of the study was to determine the IL skills of the faculty and students of PGIMER, Chandigarh and PBDSUHS, Rohtak. The specific objectives of the study are:

- To understand the respondents ability to identify and specify their information needs.
- To know the level of awareness of the respondents about different sources of information.
- To determine the respondents ability to access and evaluate the printed & electronic resources.
- To know how effectively the respondents are able to retrieve the required information from the sources.
- To know how satisfactorily the respondents are able to make use of the retrieved information.
- To know the opinion of the respondents regarding the present IL Programme of the library.

METHODOLOGY

The present study has been conducted through the survey method of research. A structured questionnaire was designed and used for collecting the data from the users of both the medical colleges. 100 questionnaires were distributed in Postgraduate Institute of Medical Education and Research, Chandigarh, out of which 90 duly filled in questionnaires were received back. Another 100 questionnaires were distributed in Pt. B. D. Sharma University of Health Sciences, Rohtak, out of which 81 respondents responded to the questionnaires.

ANALYSIS AND DISCUSSIONS

- Category-wise Distribution of Respondents

Table 1: Distribution of Respondents

Category	PGIMER	PBDSUHS
Students	57 (63.33)	55 (67.9)
Faculty	33 (36.67)	26 (32.1)
Total	90 (52.63)	81 (47.37)

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ble 1 depicts the respondents of PGIMER, Chandigarh and PDSUHS, Rohtak who responded to the questionnaires. Out of PGIMER respondents, 57(63.33) were students and 36.67%) were faculty members while among PBDSUHS spondents, 55(67.90%) were faculty members.

2 Ability to Specify Information Needs

the information explosive world, it is very important to have the ility to identify and specify the information need and have the ility to access that needed information.

Table 2: Purposes of Information Need

Purpose	PGIMER		PBDSUHS	
	Students n=57	Faculty n=33	Students n=55	Faculty n=26
Research	31 (54.39)	17 (51.52)	22 (40)	15 (57.69)
Teaching	0 (0)	19 (57.58)	0 (0)	16 (61.54)
Course Assignment	25 (43.86)	2 (6.06)	29 (52.73)	7 (26.92)
Project Work	6 (10.53)	1 (3.03)	7 (12.73)	3 (11.54)
Subject knowledge	32 (56.14)	14 (42.42)	31 (56.36)	16 (61.54)
Patient Care	21 (36.84)	15 (45.45)	25 (45.45)	13 (50)
General Awareness	20 (35.09)	10 (30.30)	26 (47.27)	14 (53.85)

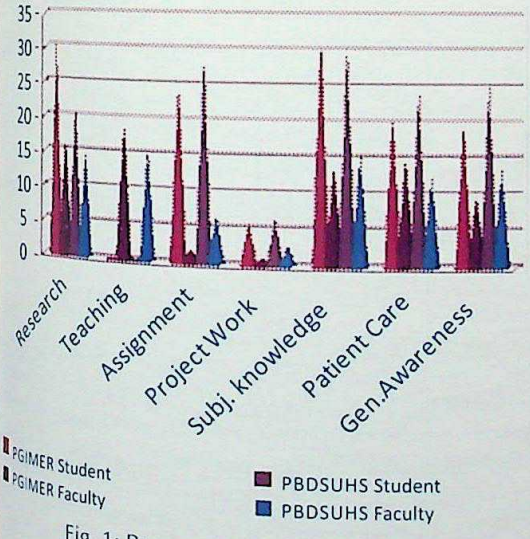

Fig. 1: Purposes of Information Need

ble 2 and figure 1 illustrates that a majority of the PGIMER dents i.e. 56.14% needed information for updating their bject knowledge and 54.39% for research. Most of the PGIMER culty members 57.58% needed information for teaching and 52% required information for research. Among PBDSUHS spondents, the majority of students 56.36% required rmation for updating their subject knowledge while 52.73% eded information for completing their course assignments. 54% of the PBDSUHS faculty members needed information teaching and for updating their subject knowledge in the area specialization.

3 Awareness with Different Sources of Information

Table 3: Frequently Utilized Sources of Information

Information Sources	PGIMER		PBDSUHS	
	Students n=57	Faculty n=33	Students n=55	Faculty n=26
Text Books	48 (84.21)	16 (48.48)	44 (80)	15 (57.69)
Journals	45 (78.95)	24 (72.73)	25 (45.45)	22 (84.62)
Newsletters	16 (28.07)	10 (30.30)	13 (23.64)	12 (46.15)
Conferences/Seminars	18 (31.58)	14 (42.42)	16 (29.09)	10 (38.46)
HealthCare Organizations	12 (21.05)	10 (30.30)	10 (18.18)	10 (38.46)
Thesis & Dissertations	27 (47.37)	12 (36.36)	11 (20.00)	14 (53.85)
Reference Books	35 (61.40)	19 (57.58)	39 (70.91)	16 (61.54)
Medical Databases	49 (85.96)	28 (84.85)	19 (34.55)	18 (69.23)
Internet Search Engines	50 (87.72)	25 (75.76)	43 (78.18)	18 (69.23)
Wikipedia	46 (80.70)	20 (60.60)	38 (69.09)	19 (73.08)
Online freeMedical Services	36 (63.16)	22 (66.67)	28 (50.91)	20 (76.92)

Table 3 depicts the frequently utilized information sources by the respondents of both the colleges. The majority of PGIMER students 87.72% frequently used internet search engines and while 84.85% of the faculty members were using online medical databases. 80% of the PBDSUHS students preferred to use text books whereas 84.62% of the faculty members were using journals to satisfy their information needs.

- Distribution of Frequently used Online Medical Databases

Table 4: Frequently used Online Medical Databases

Medical Databases	PGIMER		PBDSUHS	
	Students n=57	Faculty n=33	Students n=55	Faculty n=26
IndMed	5 (8.77)	9 (27.27)	4 (7.27)	2 (7.69)
MedIND	8 (14.03)	18 (54.55)	5 (9.09)	5 (19.23)
PubMed	48 (84.21)	26 (78.79)	29 (52.73)	25 (96.15)
MDConsult	19 (33.33)	28 (84.85)	2 (3.64)	9 (34.62)
ScienceDirect	12 (21.05)	22 (66.67)	5 (9.09)	9 (34.62)
Scopus	10 (17.54)	15 (45.45)	7 (12.73)	10 (38.46)
NML Gateway	14 (24.56)	17 (51.52)	26 (47.27)	21 (80.77)
MedlinePlus	39 (50.88)	16 (48.48)	24 (43.64)	20 (76.92)
UpToDate	28 (49.12)	14 (42.42)	2 (3.64)	4 (15.38)
ProQuest	14 (24.56)	10 (30.30)	8 (14.55)	7 (12.73)

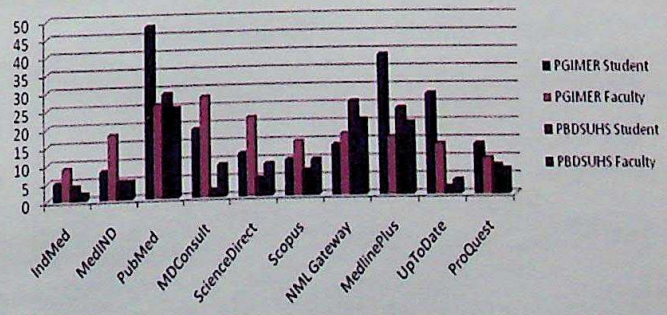

Fig. 2: Frequently utilized Medical Databases

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It is clear from the table 4 and figure 2 that 84.21%, 50.88% and 49.12% of the PGIMER students frequently used PubMed, MedlinePlus and UpToDate databases while the 84.85%, 78.79% and 66.67% of the PGIMER faculty members frequently used MDConsult, PubMed and ScienceDirect online medical databases. PubMed was frequently used by 52.73% of the students and by 96.15% of the faculty members of the PBDSUHS.

❑ Awareness with Shelving Method

Table 5: Awareness with Shelving Method

Method	PGIMER		PBDSUHS	
	Students n=57	Faculty n=33	Students n=55	Faculty n=26
ISBN	6 (10.53)	1 (3.03)	10 (18.18)	4 (15.38)
Call number	10 (17.54)	7 (21.21)	8 (14.54)	6 (23.08)
Title	37 (64.91)	23 (69.69)	28 (50.91)	12 (46.15)
Author	4 (7.01)	2 (6.06)	9 (16.36)	4 (15.38)

In order to find out the respondents' level of awareness with the shelving method used for arranging books, they were asked to mention the system used for shelving books. Table 5 shows that in PGIMER, only 10 (17.54%) students and 7 (21.21%) faculty members whereas in PBDSUHS, only 8 students (14.54%) and 6 (23.08%) faculty members chose the correct answer i.e. call number. These responses show the lack of awareness among students and faculty about the method followed for shelving books.

❑ Familiarity with Boolean Operators 'OR'

Table 6: Familiarity with Boolean Operators 'OR'

Words Combination	PGIMER		PBDSUHS	
	Students n=57	Faculty n=33	Students n=55	Faculty n=26
Lung cancer AND smoking	32 (56.14)	19 (57.58)	34 (61.82)	16 (61.53)
Lung cancer NOT smoking	3 (5.26)	1 (3.03)	1 (1.82)	2 (7.69)
Lung cancer OR smoking	17 (29.82)	13 (39.39)	10 (18.18)	8 (30.77)
Don't Know	5 (8.77)	0 (0)	10 (18.18)	0 (0)

In order to know the respondents' familiarity with the Boolean operators, they were asked to mention the operator used for retrieving maximum search results while searching article in an online database. It is clear from the table 6 that only 29.82% and 39.39% of the students and faculty of PGIMER whereas 18.18% and 30.77% of the students and faculty of PBDSUHS chose the correct Boolean operator 'OR'.

❑ Knowledge about the use of Bibliography

Table 7: Knowledge about the use of Bibliography

Information Source	PGIMER		PBDSUHS	
	Students n=57	Faculty n=33	Students n=55	Faculty n=26
Library Catalogue	12 (21.05)	0 (0)	9 (16.36)	0 (0)
Bibliography from the Article	31 (54.39)	25 (75.76)	16 (29.09)	13 (50)
Search the Database	8 (14.04)	3 (9.09)	10 (18.18)	1 (3.85)
Other Issues of the Journal	6 (10.53)	5 (15.15)	20 (36.36)	12 (46.15)

To identify the respondents' ability to make use of the retrieved information, they were asked to mention the best source for finding other related journal articles on a topic. Table 7 shows that 31 (54.39%) students and 25 (75.76%) faculty members of PGIMER were familiar whereas among PBDSUHS respondents, 13 (50%) faculty members and only 16 (29.09%) students were familiar with the use of bibliography.

❑ Access and Evaluate Information in Different Formats

Table 8: Access and Evaluate Information in Print & Electronic Formats

	Formats	Level	PGIMER		PBDSUHS	
			Students n=57	Faculty n=33	Students n=55	Faculty n=26
Ability to Access Information	Print	Very High	35 (61.4)	27 (81.82)	27 (49.09)	14 (53.85)
		High	7 (12.28)	2 (6.06)	9 (16.36)	6 (23.08)
		Average	12 (21.05)	3 (9.09)	11 (20)	4 (15.38)
		Low	2 (3.51	1 (3.03)	4 (7.27)	2 (7.69)
		Very Low	1 (1.75)	0 (0)	4 (7.27)	0 (0)
	Electronic	Very High	23 40.35)	18 54.55)	19 (34.55)	11 (42)
		High	20 (35.09)	11 (33.33)	16 (29.09)	8 (30.77)
		Average	7 (12.28)	4 (12.12)	10 (18.18)	5 (19.33)
		Low	5 (8.77)	0 (0)	5 (9.09)	1 (3.85)
		Very Low	2 (3.51)	0 (0)	5 (9.09)	1 (3.85)
Ability to Evaluate Information	Print	Very High	19 (33.33)	13 (39.39)	27 (49.09)	12 (46.15)
		High	13 (22.81)	7 (21.21)	16 (29.09)	4 (15.38)
		Average	15 (26.32)	10 (30.30)	8 (14.55)	5 (19.23)
		Low	7 (12.28)	3 (9.09)	2 (3.64)	4 (15.38)
		Very Low	3 (5.28)	0 (0)	2 (3.64)	1 (3.85)
	Electronic	Very High	10 (17.54)	10 (30.3)	3 (5.45)	6 (23.08)
		High	14 (24.56)	10 (30.3)	10 (18.18)	4 (15.38)
		Average	20 (35.09)	12 (36.36)	27 (49.09)	15 (57.69)
		Low	9 (15.79)	1 (3.03)	14 (25.45)	1 (3.85)
		Very Low	4 (7.02)	0 (0)	1 (1.82)	0 (0)

Table 8 depicts the level of the respondents in accessing and evaluating information in print and electronic format. 61.4% of the students and 81.82% of the faculty of PGIMER and 49.09% of the students and 53.85% of the faculty members of the PBDSUHS rated their skills very high in accessing information in print format. For evaluating information in print format most of the faculty and students of both the medical colleges rated their skills very high while in electronic format, most of them rated their average skills.

❑ Users Satisfaction Level and IL Programme

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Table 9: Users Satisfaction with the IL Programme

Satisfaction Level	PGIMER		PBDSUHS	
	Students n=57	Faculty n=33	Students n=55	Faculty n=26
Very Satisfied	6 (10.53)	13 (39.39)	4 (7.27)	3 (11.54)
Satisfied	20 (35.09)	11 (33.33)	19 (34.55)	6 (23.08)
Neutral	25 (43.86)	5 (15.15)	19 (34.55	13 (50)
Dissatisfied	4 (7.02)	4 (12.12)	6 (10.91)	3 (11.54)
Very Dissatisfied	2 (3.51)	0 (0)	7 (12.73)	1 (3.85)

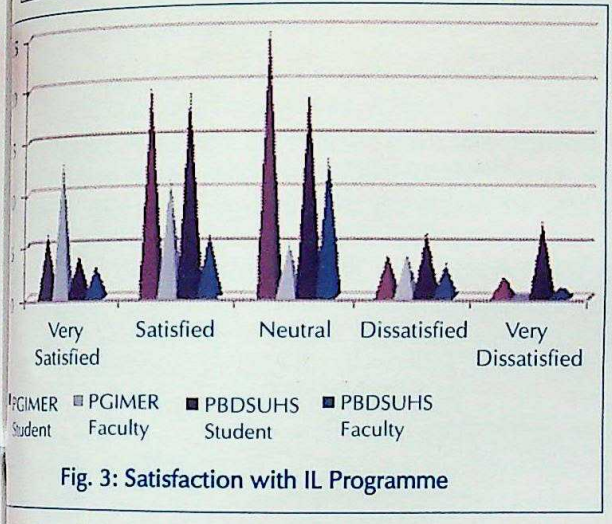

Fig. 3: Satisfaction with IL Programme

le 9 and figure 3 exhibits the satisfaction level of the pondents with the present IL programme of the library. In MER, out of 57 students, only 6(10.53%) and out of 33 faculty mbers 13(39.39%) were very satisfied. On the other hand, ong the 55 students and 26 faculty members of PBDSUHS, 4(7.27%) students and 3(11.54%) faculty members were much satisfied with the present library orientation or an IL gramme of the library.

ONCLUSION

dical professionals are the crucial life savers, their time is cious and it must be saved so that they can save more lives. It is ossible for the medical professionals to locate the information he very less spare of time and to adequately read it. The skills d abilities are required that enable them to retrieve the right rmation from the right source without wasting much time. IL is ajor prerequisite for these professionals. Keeping in view the ious specializations in the area and the needs of the medical fessionals, it is necessary for them to be equipped with IL mpetencies that can help them to effectively search, locate, aluate, and use the required information. Medical library fessionals can play an important role in this regard by anizing library orientation and IL programme. Therefore, it is g recommended that user oriented IL Programme should be anized regularly and the issues like how to retrieve information from the printed and electronic sources, various search strategies, use and advantage of keywords and Boolean operators while searching online medical databases and other electronic information resources may be included in the IL Program of the library. Moreover, IL may be added as a subject in the health science curriculum so as to make the medical professionals information literate and independent lifelong learners.

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Information Ethics in the Age of Information and Communication Technology

Narender Kumar Chauhan* and Sudhir Narayan Singh**

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*Librarian
**Assistant Professor
The Technological Institute of Textile & Sciences
Bhiwani

Corresponding Author
Sudhir Narayan Singh
sudhirnarayansingh2009@gmail.com

ABSTRACT

Even though there are noticeable and visible boom in the information industry and Information and Communication Technology (ICT) but the quality of materials and effective mobilization of both are continuing to be a nagging concern. Ethics of information and ICT both are very important in 21st century for growing up along with the economic and social development of the nation concern and human civilization. In the modern era of ethical hacking persons of generation 'Z' bother least with regards to the ethical concerns while they believe in getting their work done whether by hook or crook. Information and Technology both are inter-related just like pestle and mortar. So information and technology infrastructure both are the backbone of any developed and developing country which in turn ensures progress and provides valuable balance and future perspective. This study elicits extensively and attempts to address the ailing concerns of the information ethics and trust deficit.

KeyTerms: ICT, Information, Cyber, Ethics, Generation-Z

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INTRODUCTION

At the very foundational stage it is highly desirable to clarify the professional jargons i.e. generation 'Z' before initiating any kind of discussion and initiation of the study with regards to the professional ethics as the ethics of information in the age of ICT are needed and keen observation and high intension towards its objective has been the most important pre-requisites of progressive social order. Generation Z is all about the new generation breathing in and struggling for their survival in new millennium. The present generation clearly is about looking beyond convention, asserts Tilakraj Panjabi, Country Head DST, Worldwide Services, India. People who belong to this generation are energetic, active and have negligible patience and lack complacency. They also die hard for success without caring for ethical concerns and for them ethical compromise is not a big deal as it is success that counts. For them communication, connectivity, knowledge gaining, and sharing happens mainly through the use of technology and social media. Taking this in to account this modern generation is named as cybernatics, netigens, and digital natives. They are makers and breakers of their own paths and thus ethical discourse becomes highly relevant in the given competitive environment where nobody is ready to accept defeat and so for as the development of the holistic environment of proper cyber culture for the digital natives norms and codes of conduct of netiquettes are to be framed and defined, and the same are to be accepted unanimously, and finally they must be implemented, executed and followed religiously.

Conceptualizing Information Ethics

Information ethics has been defined as 'the branch of ethics that focuses on the relationship between the creation, organization, dissemination, and use of information, and the ethical standards and moral codes governing human conduct in society'. It provides a critical framework for considering moral issues concerning informational privacy, moral agency (e.g. whether artificial agents may be moral), new environmental issues (especially how agents should behave in the info-sphere), problems arising from the life-cycle (creation, collection, recording, distribution, processing, etc.) of information (especially ownership and copyright, digital divide, and digital rights). Information Ethics is related to the fields of computer ethics and the philosophy of information[1]. Ethics helps in

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unifying purposes, setting goals and supporting means in the accomplishment of a flawless and clean human life by setting goals for the futuristic generations so that they may receive inspiration from the established value system of the past. Information ethics are those sets of rules which are supposed to be followed by the users of ICT for ensuring a better environment for it by protecting, preserving and preventing the information flow from the reach of those irresponsible hands of miscreants, who may ever turn up as traitors to the system by becoming manipulators of information for the fulfilment of their malicious intentions in order to cater to the cheap demands of unlawful reasons.

Classical Origin of Ethical Concern

In the twenty first century information is playing pivotal role in the modern society because things are becoming online and easy to access with the help of the technology. As breaching with data and information is the major problems which people are using in an unethical way. In fact societal ethics are going down day by day because everyone has been involved in their personal benefit and at any cost he wishes to complete the competition race. And these unethical behaviors are being done since inception of the society. During Mahabharata just before the epical battle was supposed to be fought in order to cripple the confidence and enthusiasm of Karna, Shri Krishna applies an information trick and shattered his confidence and commitment by telling him that (i.e. Karna) is the eldest son of Kunti. The same has been described by Shri Ramdhari Singh 'Dinkar' in the following words:

Kya Aghatniya Ghatna Karal?
Tu Pritha Kukshi Ka Pratham Lal,
Ban Sut Anadar Sahata Hain,
Kaurav Ke Dal Mein Raheta Hain...

Kunti Ka Tu Hi Tanaya Jyestha,
Bal, Budhi, Sheel Mein Param Shrestha.
Mastak Par Mukut Dharrenge Hum,
Tera Abhishek Karenge Hum[2].

Everyone who reads the epic or knows the same by the oral tradition can easily understand, imagine, speculate or guess the kind of impact can this information have on the mind of a soldier who is otherwise considering his own younger brothers as his sworn enemies.

Drawing the Demarcation Boundaries between Ethical and Unethical

Indeed, ultimately it is only with the help of what lies beyond the apparent and hidden motives that any information can be misused for the fulfilment of the selfish motives attached so much attention to the information. Information ethics can save the cyber world from the harms of social evils. Everyday newspaper are flooded with the cases of 'paramount of sensitive information breaching' and some time gaining heavy monetary advantages out of it. The use and misuse can make or mar the destiny of nations.

A whole sect of people does believe that making it to the top requires ethical compromises. It is not that this has been practised only in the modern world, rather, the cases of ethical bargain are available everywhere in plenty. The Mahabharata: The War Epic of India is loaded with such examples of cheating, trust breaching and numerous unethical practices.

Information Ethics in Modern Indian Panorama

Even in modern India as more and more scams get reported, many cases of unethical practices are being unearthed and exhumed day by day. It seems that for a modern life in India unethical behaviours are becoming accepted norms in many organisations. In this regard the Vice President and Head- HR & FMS, Mytrah Energy (India) Ltd. Mr K. N. Ajith, rightly remarks that:

> India Inc's image has taken a real beating in the wake of many recent high-profile scandals. Unfortunately, the potential for individuals to behave ethically is limitless. But it is important that managers and organisations do not promote morally and ethically questionable practices. What is needed in today's turbulent times is for more organisations to come forward and operate with strong, positive and ethical cultures. Talking about how work ethics play a major role in today's corporate world, Alex Augustine, VP Info Systems Pvt Ltd explains, 'You wouldn't sell a fake toy to a seven-year-old, would you? Most of us wouldn't and that is exactly how I feel organisations should respond when it comes to doing business. Studies have proven that customers are ready to pay a premium for products from organisations with sound ethics and values. You will also find potential employees preferring value-driven organisations[3].

Why do Unethical Practices Exist?

Consequently, in the light of above mentioned citations it would not be an exaggeration to infer here that in progressive era of modernisation the success aspirants are ruthless towards ethical basics and the same has not been new and alien. Such practices exist in every age, in every time, in each sphere. Examples are available in abundance of the same practices where 'regardless of the type of race in order to compete successfully, one must finish the race.' In the same regard Mr W. Michael Amik Jr, President, International paper India, remarks, 'We believe and know that operating as per one's core principles builds the right foundation for successfully competing in this or any other race.'

Challenges of ICT

ICT has put forth so many new challenges in front of information channelling. Ensuring the reach and spread of Information to the persons who really need them and at the same time securing and protecting the same information-sets from the wrong and unsafe hands where they may be misused, manipulated and mal-practiced against humanity. As per the statement of Bill Gates by 2047 all information about physical objects, including humans, buildings, process and organizations, will be online. This is both desirable and inevitable. Online information can provide the speed and helps in taking quick decision for any situation.

ICT Impacts on far and wide Spread of Information

Few years ago information lies in documents, books, and ultimately in the library. However, we were not able to communicate easily as the involved transportation cost but it had maintained ethics because non-availability of fast resources of mobilization of the respective information. So due to all these concerns respective information could not used up to the effective level. Even some areas of the India like Leh Laddakh, Uri, Assam and Meghalaya where the information cannot float easily due to non availability or weak signals (due to physical disparities) of communication means. Authors strongly believe that the ethics of information are totally depending upon the

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communication means because only means can calculate the impact factor of any information and its ethics.

Issues of Limited and Restricted Awareness

Users must also be made aware that the Internet contents are not governed and regulated, and flows in and out of all countries, involves all type of the peoples, communities and all forms of organisation whether they belong to rural, urban and tribal communities. Users must know that most of the information on the internet is copyrighted and not for their personal use. Users must learn right from wrong and vice-versa in exploring the depth and breadth of information use. Information users must be taught how to evaluate sites and how to determine the issues in order to privacy when users want to ask experts for information and verification of information[4]. In the age of ICT information moves frequently but needs to know the authenticity or accountability. Every information works under a system and system can be judged on three parameters namely: availability, accessibility and accountability.

Accountability as the most Ailing Concern

Accountability is a platform for any system which they can grow and sustain in the market for long time. In the age of ICT the role of accountability is very indispensable for maintaining an information ethics that everyone can use with fully belief as per her/his requirements. Users must not be used blindly of any information system. First they must check to whom it is related and who the creator is. Although users are very much aware regarding cyber crime still flow of information through internet seems to fascinate. ICT has been successful in many ways. But those successes have extended its ambition without necessarily broadening its outlook. Information is still the tool for all tasks.

Consequently, living and working in the midst of information resources like an Internet and the World Wide Web can resemble watching a fire fighter attempting to extinguishing fire with palm. If your Web page is hard to understand, link to another. If a 'help' system gets overburdened, add a 'help on using help'. If your answer is not there, then click on through another 1000 pages. Problems with information?[5] Though Internet is a great source of information but sometimes it becomes time consuming and makes the users task tedious for example in case of e-mail generally some interested junk mails arrive which are not even related to the users work portfolio but very often they click on the same and deeply moved with the contents of the mail(s) which may in turn delay the task unduly and the accomplishment of current assignment might be left over or prolonged. This is a profound truth and applicable to each and every net user.

- A • Ambiguous information
- B • Biased information
- C • Copy right concerns
- D • Data collected from non reliable sources
- E • Exaggerated Information
- F • Fear of unforeseen outcomes
- G • Gross root Breaching and tempering with the data and information
- H • Hacking
- I • Incomplete data is a big ethical hurdle for information processing
- J • Jurisprudential Misconceptions
- K • Knuckle-breaking impacts of political & socio-cultural taboos in information gathering process
- L • Lack of objectivity in data processing
- M • Manipulated information
- N • National and International security concerns with regards to the information supplied
- O • Outreach (Critical outreach) of the information
- P • Philosophical mismatch
- Q • Quagmire of deliberate data damage with malicious intention
- R • Rigorous International pressure
- S • Squeamish Social Upheavals and Cultural Concerns
- T • Transmogrified use of partial information in the information activities and decision making
- U • Un-ethical use of information
- V • Venality of neck to neck competition
- W • Wrong inflow and outflow of information
- X • Xenophobia of Cross Cultural Communication and language restrictions
- Y • Yeow yelp of Mechanical and psychological barriers
- Z • Zug-zwang position of reliability and trust among the stakeholders

Fig. 1: A to Z Factors Influencing the Information Ethics

Ethical Extension

On account of ethical perspectives, information ethics in information activities can be divided into three magnitude viz. the ethical, the unethical and the non-ethical. The ethical information activities meet the standards of good, judiciousness,

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and laudable. In this kind of information activities, peoples' purpose must be consistent with moral and drift. That is, self-regard has to be balanced with altruism in an appropriate comprising point. On the opponent, the unethical information activities violate the public standards of goodness, drift, ethics and justice, so it is prohibited.

shows that many a times people do everything whether it is bad, non-drift, unethical, immoral or even criminal, to fulfill their benefits in information activities, though they completely know the difference between goodness and evil. The non-drift information activities are a kind of normal activities with no distinction between good and evil which shows the normal social behavior in information activities.

Double Edged Challenges and Critical Factors Influencing Information Ethics

Information factors play an important role in the development of ethics. From ancient era to modern times every decision has been taken on the basis of available data and information provided. Moreover, factual data and information having great importance in the right decision making process but this is not easy to collect the right information. Information ethics are directly concerned to the availability and usability of the right and authentic information.

Technology and Philosophy of Being Ethical in 21st Century

Technology has a great force in the 21st century because it has capabilities to change every tradition, fest of the human society and play a pivotal role as change agent. Technology informs many aspects of the human being lives. In 21st century it is impossible for humanity to move an inch without technology whereas at the same time nascent technological advancements have put forth humanity on the priority pedestal of some new challenges in front of human civilization which changed drastically and still changing every day. Routine activities of human beings got success in changing the habits i.e. suppose anyone wanting to read newspaper of any previous date will use technology instead of visiting any public library and no doubt without wasting their time they will be easily able to get access to the same. In pursuant to the above facts the same changes can be witnessed with regards to the fulfilment of the ethics. In olden days, life was simple and sober and people were less ambitious and very honest. They were emotionally attached amongst one another and consequently they used to obey the rules of the society which had been prescribed and proscribed by the grandsires of their respective societies. But in the technical society everything has been changed for the generation 'Z' citizens viz. with the advent of the computer, the computer professionals started breaching with data. They feel that this is the specific and specialised demand of the profession whereas such practices of ethical hacking unknowingly put them in the grips of unethical routine malpractices. The new name of this knack has been assumed as the 'highly professional society'. So the technology has changed the very mindset of the modern society. So there should be no objection to say that in Technical Society, Information Society or 21st century society ethics can be technologized and dominate the tradition of the human civilization.

Information Ethics and Individualistic Information Security Concerns

In the modern society there have been many events about personal information breaching. Almost every minute people live in constant fear with regards to the protection of their data of paramount importance and have to threaten by the hackers and virus attacks. In this information age, Information technology has become ubiquitous as the use of information technology introduces drastic cost reduction, ensures easy access, 24*7 accessibility and opportunities to become more competitive. For the generation 'Z' of the 21st century messaging are very informal, immediate, personal, seamless, simple, more informative, short but with all these facilities there are some demerits as well viz. the fear of breaching with personal data, manipulation with data and the hackers can be produced in any form. Personal information security is not a new problem. In fact latest development in technology brings with many new and multiple sort of problems. New technologies have affected multiple facets of dealing with private information in the areas of communication, commerce, government and education etc.

Information Complexity and Crisis of Ethical Dilemma

The situation is described as 'scramble between privacy and technology.' In the tacit/explicit ethics, it is easy to understand what is right and what is wrong while dealing with the personal information in the age of technology or information society. The definition of privacy given by Warren and Brandeis as the 'right to be let alone' is described as the most comprehensive of rights and the right most valued by civilized men. It means the personal information should be controlled out of one's own inclination. 'Control over information' means that 'individuals have the right to decide 'when, how, and up to what extent information about them is to be communicated to others'. However, keeping in view the above mentioned facts first one should know the factors affecting the personal information in an unethical usage of information.

Inferential Observations

In ancient times the flow of information was slow and the communicating means were either very poor or highly restricted to limited periphery and so their harms were also damaging to the limited groups but in the modern age information floating just like a storm and sometimes when they take shape of rumours they can make or mar alter the future-destiny of billions by causing high risks to the property and lives of all concerned. Societies have become modern and believe in technology usages even kids of five or six years old are also familiar with the critical usages of technology, they can easily send SMS or download ring tones, games from another mobile or by accessing internet so the impact of emerging technologies on the habits of the users can easily be seen. In this regard it would be better here to ponder deeply over the statement of Chief Marketing Officer and Head-Talent, Aegon Religare Life Insurance Mr Yateesh Srivastava who holds the opinion that:

'Gen Z has the ability to search for information; process it speedily and disseminate it to a variety of people at their own discussion. This gives them the ability to bring the new perspective in a multitasking scenario[6].'

The authors feel that the very concerns of ethical roots lies here

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which is required to be tackled with patience, grit and a lot of perseverance where this new generation will need to be conditioned as per the ethical needs of the pivotal concerns. They cannot be expected totally detached from technological environment as this will hamper their growth and disabled them in the world of spearheading competitiveness. Moreover, this generation feels 'bereft if its access to technology and social network is restricted.'

CONCLUSION

Needless to say that everyone is aware and accepts that where there are merits of technological advancements, no doubt demerits will come automatically. People can feel the existence of merits and they even strive hard for the establishment of equilibrium of balancing between merits and demerits and harms and benefits. The mature sense of cosmopolitan citizenship and a deep rooted ethical sense of belongingness and sensible usages of ICT teach community how to treat with the data and information ethically and responsibly. In ICT era information floating is very fast and the same is desirable as well but on the contrary sometimes the information flows are used unethically even if users carry good intentions.

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Virtual Learning Environment with Open Source Software: MOODLE

Dipti Arora*, Shalini Lihitkar** and Projes Roy***

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*Defence Scientific Information & Documentation Centre (DESIDOC)
Defence Research & Development Organisation, Delhi
** Assistant Professor
DLIS
RTM Nagpur University
Nagpur- Maharashtra
***Head Librarian
Rajguru College of Applied Science for Women,
University of Delhi, Delhi

Corresponding Author
Dipti Arora
dipti30arora@gmail.com

ABSTRACT

Virtual learning environment became very popular in the present learning environment. Not only higher education institutes, rather small institutes are also adopting it to facilitate their students. Present paper is in effort made by a small study centre run by IGNOU to create such learning environment. Open source software, i.e. MOODLE (Modular Object-Oriented Dynamic Learning Environment) was used for the present study. The software was customized as per the requirements, especially considering a distance education mode institute, tested it by uploading information/ data including grades, assignments, students profile, etc. for the present study. The students of the centre were acquainted with the practicalities of the MOODLE. This article endeavors to discuss the experiences of the administrator, teachers and also the ultimate users with the present study.

KeyTerms: Virtual Learning Environment, MOODLE, IGNOU, Open Source Software, e-Learning, Content Management System.

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TRODUCTION

ducation in the present era has moved out of the vicinity of assroom, lectures, and printed course material. Today, erything revolves around the 'e' i.e. electronic. Students are terested to have everything which is available online. niversities and colleges started providing information, nouncements, and other related communication online long ck. Then came the time when academic institutes started loading their course material. With this, students need not have wait for the printed books, and can access the credits anytime, ywhere. It established a learning environment which gave ss to the virtually available classrooms. E-learning, web-arning, online learning are all synonyms and used for providing ducation via world wide web. Virtual learning environment is e step ahead of the e-learning.

RTUAL LEARNING ENVIRONMENT

any higher educational institutions adopted virtual learning vironment (VLE) for facilitating their students. VLE is a mbination of modules uploaded on the internet that keep them dated with latest information, newsfeeds, contents, etc. Some the VLEs also provides other features like blogs, wikis, forums, self assessment quiz, online assignments, and links to external content which can be of use to students, irrespective of their geographical locations. Students need to register to their course and classroom session. They can even monitor their grades apart from basic features like notifications, time table, schedule, etc. Various other terminologies are also used for VLE like tele-learning, web-based learning, internet learning, but most widely used is Content Management System (CMS). There are much commercially available and freely available software with which such environment can be created. With the help of Internet and other web technologies students can register and can use it. Some of the VLE softwares are:

- ExpressionEngine
- WordPress.org
- Mambo
- Joomla
- Dokios
- ILIAS
- eFront
- MOODLE, etc.

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Open source VLE software also serves many features that are available in the commercially available VLE software. By customizing them as per the requirements they can very well be utilized for any institution.

Virtual Learning Environment for IGNOU Study Centre

IGNOU is one of the largest distance learning institutes established in the year 1985. The 0771 P is one of its premier study centre imparting education in the streams like Bachelor in Library & Information Science (BLIS), Masters in Library & Information Science (MLIS), and Post Graduate Diploma in Library Automation and Networking (PGDLAN), etc. Since it is a distance learning institute, it has only weekly batches. Students come from far off places and have no source of communication except phone to know about time table, schedules, batches, date about submission of assignments, tests, etc. So an initiative was taken to help students, so that they could be acknowledge about such issues. Also to develop a forum where they can discuss latest news, happenings, share their ideas, have look of the presentations of teachers, and lots other facilities also.

OBJECTIVES

The objectives of the study :

- Create a virtual learning environment
- Develop course and other related information
- Register students as users and notify them
- Update every latest information for the students
- Develop blogs, forums, modules, assignment and material for the study
- Analyse the feedback of the students about the features and experience of using it.

METHODOLOGY

Since this was a proto research project and an initiative in itself. So a trial run on a free webhosting site was utilized. MOODLE was downloaded and customized with necessary modifications. BLIS course was designed and updated with every detail. A demonstration was given to the students. BLIS students were registered as authorized users (as it was the trial run) and freedom was given to them to use it in their way. Time to time feedback were obtained and changes were made with the aim to build a fresh modular VLE in the future.

LITERATURE REVIEW

Various studies have been carried out earlier also regarding implementation of the MOODLE at one's institute and also about comparisons of MOODLE with other available software like Atutor and Blackboard etc. Bansode[1] did a study on e-learning experience and its implementation at the Department of LIS at University of Pune. He concluded that it was difficult for students to switch to such environment, but then they started using it and felt comfortable with it. They said, they are even planning to use it for other courses as well.

Monarch[2] says that for higher education, many government agencies, small and medium sized businesses, and nonprofits are switching over to virtual software environment using either Sakai or MOODLE. It compares both the software and concludes that they have the scalability and capacity to handle large scale installations for more than 200,000 users. MOODLE offer rich feature sets, excellent administration and management tools, and enterprise-grade security. If one is looking for ease of use, extensibility, and a wide base of other customers, as well as support and service vendors, MOODLE suits better.

Paynter3 concluded that many students found using MOODLE very comfortable and effective. Atleast 75 % of their respondents agreed that MOODLE enabled communication and collaboration skills to develop. More than 90% students felt that independent learning skills were also developed using MOODLE. Also it helped to develop a positive correlation between faculty and the students.

❑ MOODLE

MOODLE i.e. Modular Object-Oriented Dynamic Learning Environment is a web-based virtual learning environment. Developed by Martin Dougiamas, it is an open source software, under GPL license, SCORM 1.2 compliant, and also a member of IMS Global standard group. MOODLE can be installed on any computer that can run PHP, and can support an SQL type database (for example MySQL). It can run on Windows and Mac operating systems and many also on flavors of Linux. Presently MOODLE have 81345 registered sites in 233 countries, with 69,306,367 users (as on 5th May, 2013). Out of this United States have highest number of registrations i.e. 13,588[5]. Presently, it is running in version 2.5.

For the present study, MOODLE's latest version was downloaded, necessary modifications were carried out in the PHP files, and a SQL database was created to store the registered users' profile and other details. As it was a proto project, free web hosting sites were tested for hosting the MOODLE website. After successful uploading, a demonstration was given and students were given the freedom to explore it in their way.

■ Development of Course and Registering Users

Seven subjects are offered by IGNOU for BLIS. The subject Information Technology: Basics course was taken for the present study. 50 students were registered for this study. Out of that 45 were the active users who constantly used VLE offered and also frequently gave their feedback to upgrade it. As structure of MOODLE is very user-friendly and also easy to use, still at user end students should not face any difficulty, so a demonstration was given and also the staff was trained so they can guide students anywhere if they struck. All credits for this course were also uploaded on the MOODLE, so students could download the course material. Some teachers also gave their presentations and notes, these were also made available to the students in case they were unable to note it down in the class room sessions. Fig. 1 and fig. 2 shows the Course details and the users details on the MOODLE page. MOODLE offers many course formats like LAMS, SCORM, Social etc. But as this centre offer only weekly batches so weekly format was chosen.

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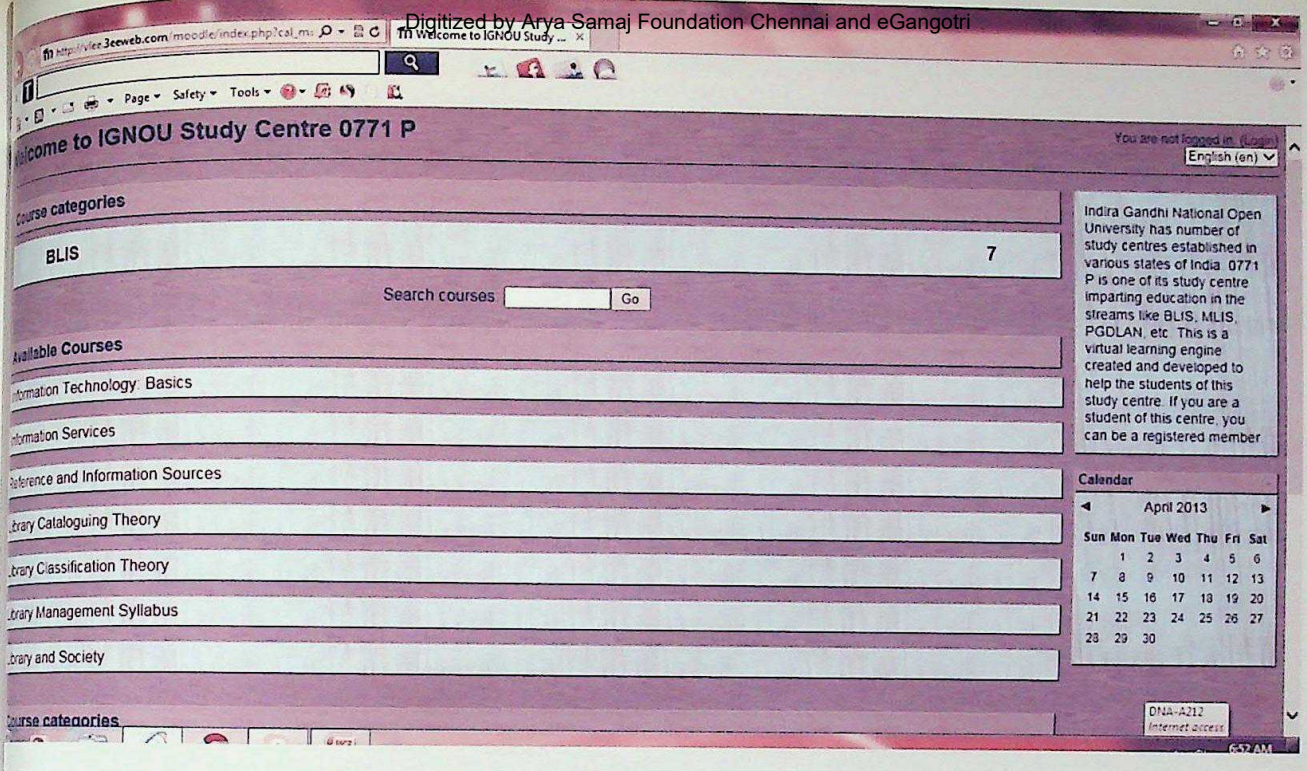

Fig. 1: Course Details on the MOODLE Page

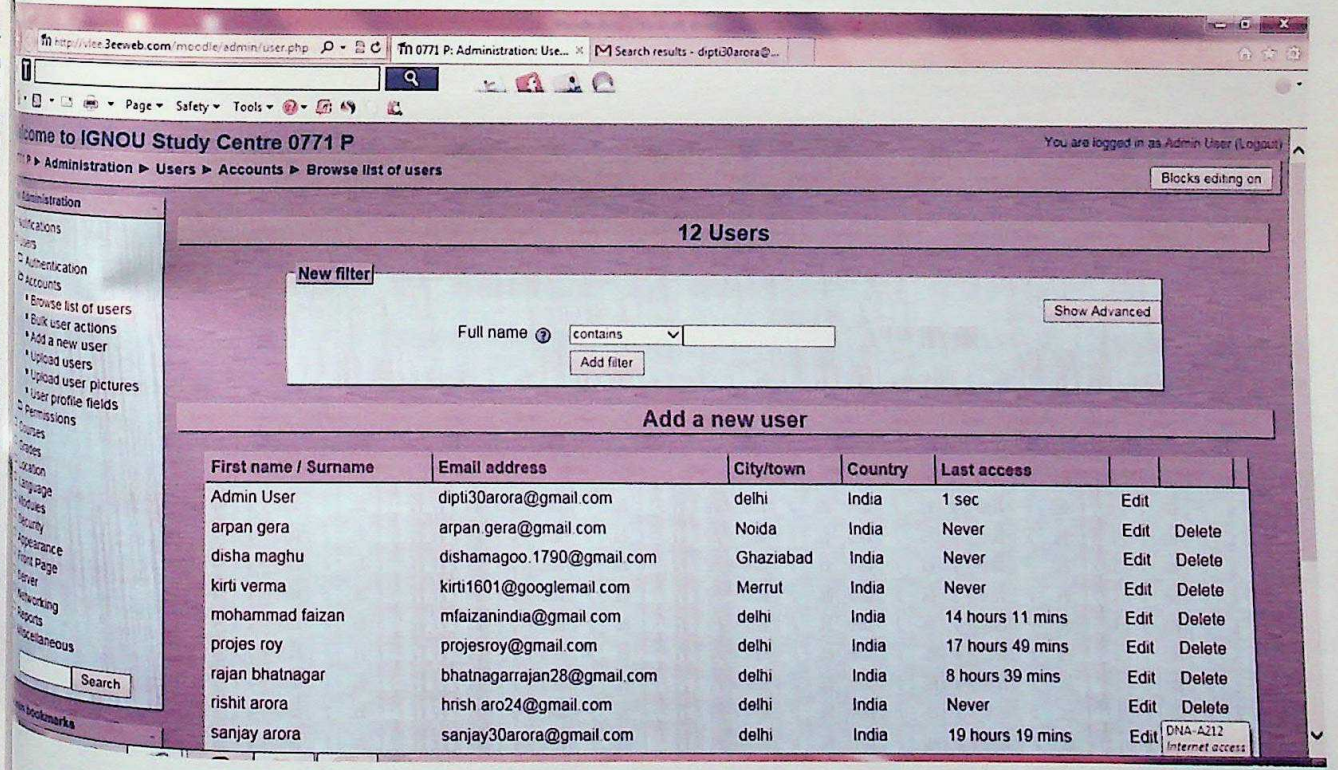

Fig. 2: Students Details on the MOODLE Page

Activities in MOODLE

Apart from basic features and designs, MOODLE offers lots of other activities that make MOODLE special, more user-friendly and also easy to use. Some of them are as shown in fig. 3. Students themselves created many blogs and forums and were many times observed discussing current issues. Since notifications were also sent to them on their registered e-mail id, it helped them a lot (as said by one of the student in their comments).

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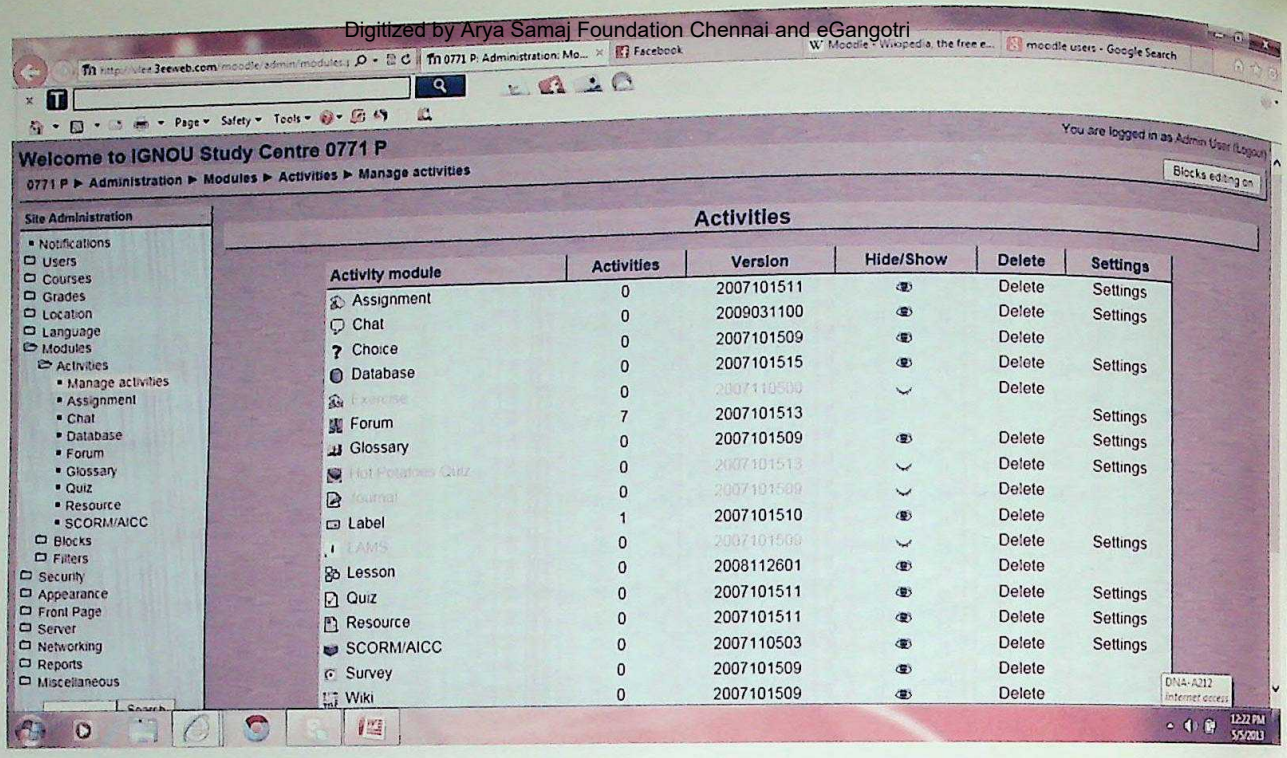

Fig. 3: Activities in MOODLE

❑ Blocks in MOODLE

Apart from the basic features MOODLE also offers various blocks under the modules offered like book mark, calendar, RSS feeds, HTML, flickers, etc. as shown in the fig. 4. One can also configure the activities as per its requirements and use. Also one can index the activation for various activities in the modules and can also search it globally, i.e. throughout the MOODLE web site. As only administrator can alter settings, and can do modifications, but rights can be given to the user members for various other activities like chat, wikis, forums, etc. MOODLE also offers security with its policies at various steps like HTTP security, module security, notifications, and anti-virus activation.

Fig. 4. Blocks Available in MOODLE

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Report Generation

As it was a trial website created, it was necessary to check the users' feedback, their likes dislikes, comments, suggestions, fields and areas they use widely and also what could be their future requirements. Based on this a weekly schedule format was chosen to generate reports. Scheduled back-up was also enabled so offline monitoring could also be done. MOODLE provides both course report and admin report, but when enabled in the index PHP file, both reports could be viewed simultaneously. Though, administrator carry the rights to generate and log the reports, but rights can be designated to teachers as well, so they can analyze it subject wise also. Once generated permission to view the report can be enhanced to users too. The report section is very important and useful, as not only it shows the complete log-in and grades report etc for the students, also it can be useful for analyzing the feedback for students at the individual level also. Fig. 5 shows how the grade part in the report can be viewed for a particular user.

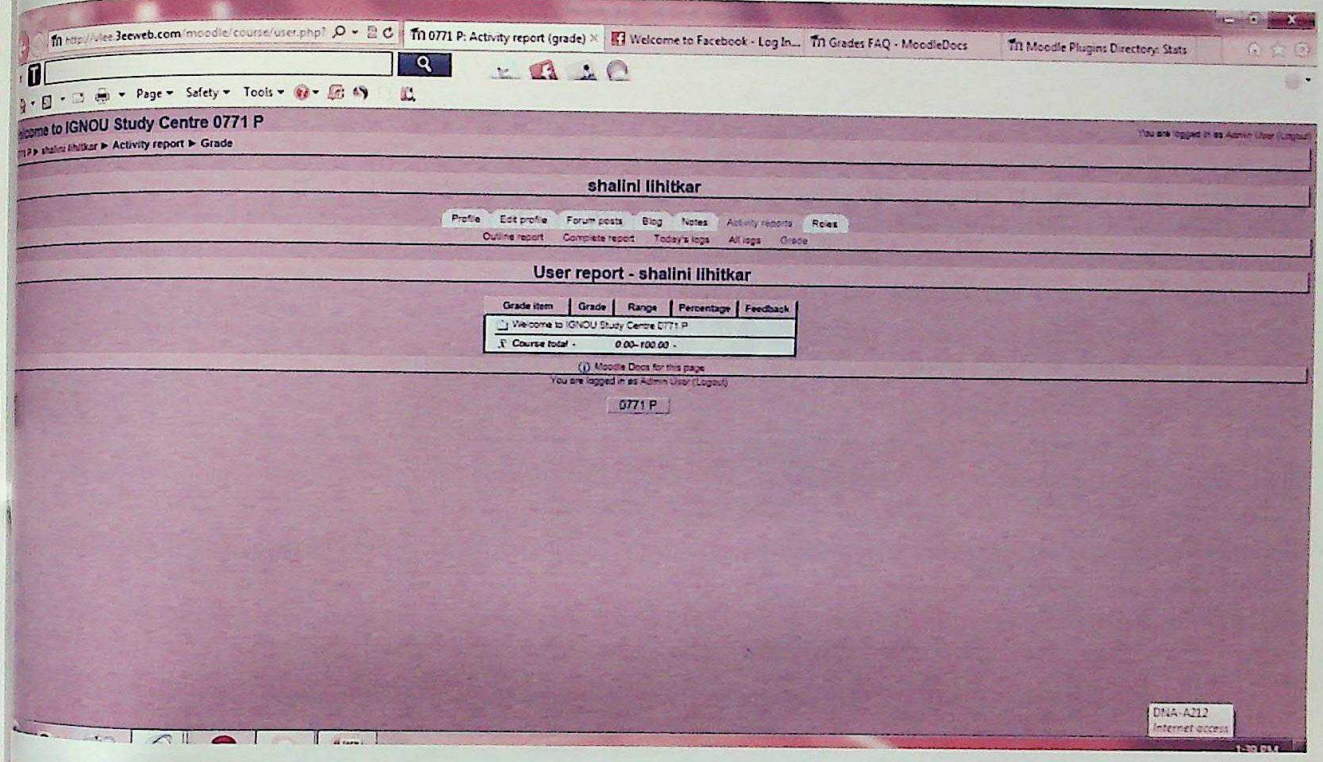

Fig. 5: Grades View in the Generated Report

DISCUSSIONS

As discussed earlier also, just under a trial run such initiative was taken. But with the tremendous response from the users, it was observed that such type of environment not only generate enthusiasm among the students but also an atmosphere where they can discuss class rooms issues sitting from home also, whatever the geographic location is. Almost daily log-in was seen for almost every user as they were keen to see, what new information have been uploaded on their institute's VLE website. Later on their e-mail notifications were also activated. Though MOODLE does not provide registering from the user end, i.e. only administrator carry the rights to create user, so it was decided that in future, a separate PHP file will be added to the index file, to provide users a log-in window with the required registering profile information. Not a single student said, that it was difficult for them to use, rather heartedly they accepted such initiative. Students also gave number of suggestions for the further version also. They felt such system was required for other subjects also, it could have helped them lot for preparing their exams (as said by one of the student). Some students also demanded to upload the credit-wise or topic-wise videos for some of the common subjects, like how to search the DDC or UDC number for a particular title. Such idea was reserved for the future full version for inclusion.

CONCLUSION

Having huge discussions with teachers, students, and every other registered member, it was concluded that moving out of adding charismas to the website, such type of environment are appearing as need of the tomorrow. This not only helps students to keep them updated, rather helps managing staff also doing similar task for every individual student. It provides forum to the students, where they can discuss with the common minded community. Though, this study was done for only one course, but in the future, it can be extended for other subjects of BLIS and other courses as well.

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Status of Engineering College Libraries in Sonepat, Haryana: A Comparative Study

Mehar Singh

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Deputy Librarian
DCRUST
Murthal- Sonepat

Corresponding Author
Mehar Singh
mehar859mukesh@yahoo.co.in

ABSTRACT

This paper highlights the results of a research study conducted to the status of engineering college libraries in Sonepat, Haryana. To estimate the performance of engineering college libraries in Sonepat and find out the resources and services provided by these libraries. The purpose of this paper is to know about state of the art, current status of IT applications, use of computer based services, networking, software package and present scenario of engineering college libraries.

KeyTerms: Library Services, Library Networking, Library Automation.

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INTRODUCTION

Due to the limited resources, collection development in technical institutions libraries is a challenge for librarian. Libraries must frequently update their services to suit the rapid development of society and economy[1]. The rapid development of information and communication technology particularly in IT applications, the present library has changed the conventional methods of research, storage, retrieval and communication of information. In fact, the libraries are an integral part of teaching learning process in the academic institutions for accessing and retrieving of information. The library environment is highly workable and accepted as being well maintained[2].

SCOPE

The study is limited to the selected engineering colleges located in Sonepat, Haryana. These are listed in table as under:

Table 1: Engineering Colleges

Name of College	Abbreviation
Bhagwan Mahavir Institute of Engineering and Technology	BMIET
Bhagwan Parshuram College of Engineering	BPCE
Gateway Institute of Engineering and Technology	GIET
Hindu College of Engineering	HCE
International Institute of Technology and Management	IITM
Shri Balwant Institute of Technology	SBIT

METHODOLOGY

A questionnaire was designed with multiple choices questions to collect the primary data including observation and informal interview with selected engineering college librarians. The relevant data was collected from BMIET, BPCE, GIET HCE, IITM and SBIT the affiliated institutions and analysed in suitable manner.

LITERATURE REVIEW

Sharma[3] conducted a study on Status of Textile Engineering College Libraries in Haryana, India. They found that total collection of Technological Institute of Textile and Science (TITS) library is nearly three times more than Panipat Institute of Textile and Science library. They also found that both the librarians are satisfied with the available budget. Both libraries offers Current Awareness Service and photocopy services. They have compared the IT infrastructure. TITS library uses window 95/98/2000 and UNIX whereas PIET uses window XP. Both libraries have LAN connectivity and are member of INDEST-AICTE Consortium. Kaur[4] did an exploratory study of marketing of information services and products in university libraries of Punjab and Chandigarh, India, and point out that university library spend huge amount every year in building up their collections and offering library services. Karn[5] conducted a study on 'Status of state libraries in Jharkhand' and revealed that the state public libraries in Jharkhand are not in a good condition. The library services are ill supported, undernourished, unappreciated and under staff, struggling to provide minimal service. There has been

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growth in some limited areas, but it is only a beginning and there is still long way to go before the public is assured of satisfactory library service. There is a great challenge before the state government to nourish these state libraries in order to strengthen the knowledge base of the people of Jharkhand.

DATA ANALYSIS

The data obtained through the questionnaire from various engineering college libraries and analyzed here under. The data is presented and evaluated using tables and figures in suitable method.

❑ Printed Materials in Libraries

Table 2: Printed Materials in Libraries

Name of Colleges	Books	Periodicals	Dissertations	Standards	Magazines	Any Other
BMIET	30743	51	51	-	13	-
BPCE	18085	93	-	-	30	-
GIET	18768	60	42	-	25	-
HCE	16254	50	100	-	30	-
IITM	20477	30	-	-	8	-
SBIT	30115	48	-	-	25	

Table 2 shows that the BMIET library has the largest collection of books i.e. 30743, followed by SBIT with 30115 books, IITM with 20477 books, GIET with 18768 books, BPCE with 18085 and HCE has the collection of 16254 books. The maximum periodicals are found in BPCE library with 93 periodicals followed by GIET with 60, BMIET with 51, HCE with 50, SBIT with 48 and IITM has 30 periodicals only. Maximum dissertations are found in HCE library with 100 followed by BMIET with 51 dissertations and GIET has 42 dissertations only excepting BPCE, IITM and SBIT libraries. The BPCE and HCE libraries has the largest and same collection of magazines i.e. 30, followed by GIET and SBIT libraries has the same collection with 25, BMIET with 13 and IITM has the 8 magazines only. None of the selected engineering college libraries have the standard material for their users.

William[6] found in his study that for effective collection development requires understanding the research needs of patrons and the selectors would have subject expertise.

❑ Non Book Material in Libraries

Table 3: Non Book Material in Libraries

Name of Colleges	E-Books	E-Journals	E-Databases	CDs	Audio Visual Material	Any Other
BMIET	-	900	-	2010	-	-
BPCE	-	1450	-	800	-	-
GIET	-	275	-	80	5	-
HCE	-	240	-	300	-	-
IITM	10000	2500	-	1000	-	-
SBIT	-	1140	-	3000	50	-

Table 3 indicates that only IITM library has e-books i.e. 10000 and none of the engineering college libraries have the collection of non-book material i.e. e-books excepting IITM library. The maximum e-Journals are found in IITM library with 2500 e-Journals followed by BPCE with 1450, SBIT library with 1140, BMIET library with 900, GIET library with 275 and HCE library has 240 e-Journals only. Maximum CDs are found in SBIT library with 3000 followed by BMIET library with 2010 CDs, IITM library with 1000 CDs, BPCE library with 800 CDs, HCE library with 300 CDs and GIET library has 80 CDs only. SBIT and GIET libraries have audio-visual material i.e. 50 and 5 in the library. E-databases are not available in the entire engineering college libraries.

❑ Services Provided by Libraries

Table 4: Services Provided by Libraries

Name of Colleges	Biblio-graphical	Circulation	Reference	CAS/SDI	Indexing and Abstracting	ILL
BMIET	No	Yes	Yes	No	No	Yes
BPCE	No	Yes	Yes	No	No	No
GIET	Yes	Yes	Yes	No	No	Yes
HCE	No	Yes	Yes	No	No	Yes
IITM	No	Yes	Yes	No	No	Yes
SBIT	No	Yes	Yes	No	No	Yes

Table 4 reveals that majority of the engineering college libraries except GIET are not providing the bibliographical services to its users. Circulation and Reference services are provided in all the engineering college libraries. None of the libraries has the availability of CAS/SDI and indexing/abstracting services for its users. The entire engineering college libraries except BPCE are providing the services of Inter Library Loan to its users.

❑ Library Automation

Table 5: Library Automation

Name of Colleges	Library Automated	Year of Library Automation	Library Software	First Activity Automated
BMIET	Yes	2004	TechLib-5	All Housekeeping Operations
BPCE	Yes	2011	Library Manager	Acquisition
GIET	Yes	2012	ERP	Acquisition
HCE	Yes	2007	TechLib-7	Acquisition
IITM	Yes	2013	TechLib-7	Acquisition and Circulation
SBIT	Yes	2007	TechLib-7	Acquisition and Circulation

Table 5 highlights that all the engineering college libraries have automated all its house-keeping operations from the last decades. BMIET library was the first who started library automation in 2004 followed by HCE and SBIT libraries in 2007, BPCE library in 2011, GIET library in 2012 and IITM is the last one to start library automation in 2013. Most of the college libraries are using the specific application software of TechLib but BPCE college library is using free library software i.e. Library Manager and GIET is using ERP. BMIET library has automated their all housekeeping operations, BPCE, GIET and HCE college libraries automated their acquisition. IITM and SBIT automated their activity of acquisition and circulation.

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Table 6: Infrastructure

Resources	Name of Colleges						Total
	BMIET	BPCE	GIET	HCE	IITM	SBIT	%age
UPS	Yes	Yes	Yes	Yes	Yes	Yes	100%
Computers	Yes	Yes	Yes	Yes	Yes	Yes	100%
Scanner	Yes	Yes	Yes	Yes	Yes	Yes	100%
Fax	No	No	No	No	No	Yes	16.6%
Xerox machine	Yes	Yes	Yes	Yes	Yes	Yes	100%
TV	No	No	No	No	No	No	0%
LCD Projector	No	No	No	No	No	Yes	16.6%
CD Server	No	No	No	No	No	No	0%
Server	Yes	Yes	Yes	Yes	Yes	Yes	100%
CCTV Cameras	No	Yes	Yes	No	Yes	Yes	66.6%
Barcode Scanners	Yes	No	Yes	Yes	No	Yes	66.6%
Printer	Yes	Yes	Yes	Yes	Yes	Yes	100%
Website	Yes	Yes	Yes	Yes	Yes	Yes	100%

Table 6 shows about the availability of infrastructural facility in library for automation purpose. The above table shows that 16.6% college libraries have the facility of FAX, LCD Projector, 66.6% college libraries have CCTV Cameras and Bar-code scanner facility. All the college libraries have their UPS, computer, scanner, xerox machine, server, printer and website and none of the college libraries have the infrastructure facility for library automation like TV and CD server.

Factors Led to Library Automation

Table 7: Factors led to Library Automation

Factors	Name of Colleges						Total
	BMIET	BPCE	GIET	HCE	IITM	SBIT	%age
Librarian initiative	Yes	Yes	Yes	Yes	Yes	Yes	100%
Heavy work load	No	Yes	Yes	No	Yes	No	50%
Need to improve the quality of services	Yes	No	Yes	Yes	Yes	Yes	83.3%
User's pressure	No	No	No	No	Yes	Yes	33.3%
To minimize respective task	Yes	Yes	Yes	No	Yes	No	66.6%
Special grant provided	No	No	No	No	Yes	Yes	33.3%

Table 7 describes that all the librarians have taken initiatives to automate their respective libraries. 50% of the libraries have to opt automation due to heavy workload. More than 83% of the libraries implemented automation to improve the quality of services. Only 33.3% of the engineering college libraries have implemented computerisation due to the pressure of their library authorities and due to special grant provided. 66.6% of the librarians automated to minimize the respective task.

Library Networking

Table 8: Library Networking

College	LAN	Type of Network	Media Used	Ports on Hub
BMIET	Yes	LAN/WAN (WiFi)	WiFi	5
BPCE	Yes	LAN	Wire	13
GIET	Yes	LAN	Cat 6	24
HCE	Yes	LAN	Wire	10
IITM	Yes	LAN	WiFi	10
SBIT	Yes	LAN	WiFi	15

Table 8 indicates that the LAN networking facility is available in all the engineering college libraries. Half of the libraries are using WiFi media for their networking. GIET library is using cat 6, BPCE and HCE libraries are using wire for networking. Maximum numbers of ports 24 on hub are found in GIET followed by SBIT with 15 ports, BPCE with 13 ports, HCE and IITM libraries with 10 ports and BMIET library has only 5 ports for networking.

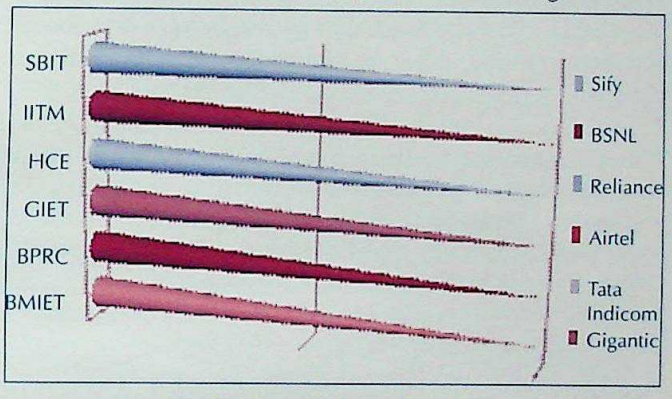

Fig. 1: Internet Service Providers

Figure 1 shows that the BMIET library has the Sify Internet Service Provider (ISP). BPCE and IITM libraries has only single ISP i.e. BSNL. GIET library has the Gigantic ISP whereas HCE and SBIT libraries have internet connectivity with Reliance.

Sharma[7] found in his study on status of college libraries in Karnal (Haryana) that GCK, DSCK, KVADAV and GNKCK libraries has only single ISP i.e. BSNL and DAVCK library has internet connectivity with two subscribers i.e. BSNL and Airtel.

MAJOR FINDINGS

- Highest reading materials including books, periodicals, dissertations and magazines and non-book materials are available in the BMIET library.
- Greatest non-book materials are available in the IITM library. None of the libraries have e-books except IITM library.
- None of the libraries has the availability of CAS/SDI and indexing/abstracting services for its users.
- The total 16.6% college libraries have the facility of FAX, LCD Projector, 66.6% college libraries have CCTV Cameras and Bar-code scanner facility. All the college libraries have their UPS, Computer, Scanner, Xerox machine, Server, printer and website, the infrastructure facility for library automation.
- The majority of the engineering college libraries implemented automation to improve the quality of services.

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- LAN networking facility is available in all the engineering college libraries. Half of the libraries are using WiFi media for their networking.
- The Maximum ports 24 on hubs are set up in GIET library.
- All the engineering college libraries have BSNL, Reliance and Sify Internet Service Provider.

SUGGESTIONS

Special funds provision should be made in the annual budget to improve the status and non-book materials in the libraries. The subscription of e-books and e-Journals should be increased. The users orientation programme needs to be started. The high-quality software package with anti-virus should also be properly installed in the libraries. Well qualified and experienced technical staff should be there in the digital section of the library to solve the user's problems. The power backup device should be provided as it save the user's data for the duration of suddenly power cut.

CONCLUSION

The main purpose of this study has been to recognize the status and use of the application of information technology in engineering college libraries located in Sonepat, Haryana. The present survey to study the condition of selected engineering college libraries in the situation of resources, computer based services, infrastructural facility for library automation, networking and internet services providers activities carried out in these college libraries. It covers also the factors and infrastructural facilities who led to library automation. Therefore, the management supports, staff co-operation, play a vital role in developing the efficiency in library services in these institutions

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Concepts of Knowledge Management among Library & Information Science Professionals

Shabahat Husain* and Mohammad Nazim**

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*Head
DLIS
Aligarh Muslim University, Aligarh
**Assistant Librarian
Faculty of Law
Banaras Hindu University
Varanasi

Corresponding Author
Mohammad Nazim
nazim76@gmail.com

ABSTRACT

This study aims to identify, collect and critically review the research literature on the concepts of Knowledge Management (KM) among Library & Information Science (LIS) professionals. The present study is based on the review of published work in the field of KM and librarianship. It has been observed that the knowledge which is embedded in people (their skill and expertise) as well as knowledge of working processes of libraries (explicit knowledge) recognized as the important sources of knowledge within libraries. Skills of LIS professionals in librarianship and information management can be very beneficial to KM, but these are not sufficient and there is a need to acquire additional competencies in the fields of communication, human resource management, change management, project management. Based on the extensive review of literature, this study provides a theoretical foundation for further research to investigate the problems and prospects of implementing KM in libraries.

KeyTerms: Knowledge Management, Library & Information Science, Emerald, Science Direct, LISTA, DOAJ, Google Scholar, J-Store.

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INTRODUCTION

In the age of the globalization and increased worldwide competition, many organizations are looking for new ways to gain competitive advantage. In doing this, these organizations are trying to use a variety of organizational resources. Today, knowledge, as an intangible asset, has taken precedence over traditional organizational resources such as capital and labour. Knowledge in organization resides within individuals as well as working processes, which is more specifically known as tacit and explicit knowledge respectively. KM as an emerging discipline focuses on the various management processes that facilitate creating, identifying, capturing, creating, storing, sustaining, applying, sharing and renewing knowledge to improve an organization's performance.

The advent of the internet and related technological developments has transformed the nature of library and information services. In the midst of these changes, KM has emerged as a further significant influence on library practice. Libraries embrace vast amounts of knowledge in various areas and its management is considered important for providing quality information services, making effective decisions, improving their overall performance and becoming more relevant to their parent organizations. However, practices of KM seem uncommon among LIS professionals as reflected within LIS literature. Therefore, the present study aims to examine the concepts of KM prevail among LIS professionals.

OBJECTIVES

- To examine the concepts of knowledge and KM.
- To determine the scope of KM in LIS profession.
- To examine the opportunities and threats for LIS professionals as emerged from the origin of KM.
- To identify the requirement of competencies among LIS professionals for their involvement in KM practice.

METHODODOLOGY

Since the basic purpose of the present study is to examine the concepts of KM among LIS professionals, literature survey method was found suitable. 51 articles related to KM and libraianship were identified from various databases, including Web of Science, Emerald, Science Direct, Library, Information

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Science and Technology Abstract (LISTA), Directory of Open Access Journals (DOAJ), Google Scholar and J-Store, using the combination of keywords knowledge management and libraries. The literature review is narrow in the sense that only studies using these keywords were included. The paper is organized into five sections. The first section is devoted to the concept of knowledge. The second describes the concepts of KM and its relationship with librarianship and information management. The third examines the scope of KM in the LIS profession. The fourth discusses the opportunities and threats emerged from the origin of KM. In the final section, a discussion on the requirements of competencies for LIS professionals is presented.

Concept of Knowledge

Knowledge is defined as justified personal belief that increases an individual's capability to take effective action[1]. Knowledge in an organization may be distinguished either as explicit or tacit knowledge. Explicit knowledge is defined as formal and systematic knowledge, which can be expressed in words or numbers and can be documented or stored in databases as electronic records. Examples might include a telephone directory, an instruction manual or a report of research findings. While tacit knowledge is the subjective and experience based knowledge difficult to articulate or write down[1]. It can be shared between people through discussion, stories and personal interactions. It includes skills, experiences, insight, intuition and judgment.

In libraries, explicit knowledge is either generatated within the organization, such as reports, memos guidelines, theses, minutes of meetings, etc. or acquired from external sources, including books, journal articles databases, external reports, government information, etc. Tacit knowledge, on the other hand, resides in senior and experienced employees with a sound knowledge of work procedures, rules and regulations, etc and the unarticulated knowledge contained in the librarians themselves[2]. Both types of knowledge (explicit and tacit knowledge) is considered as the key knowledge sources of a library which should be managed properly[3].

Concept of Knowledge Management

Although the concept of KM emerged from the business sector, its practices are now being applied in the domain of non-profit and public sector organizations including academic institutions. Increasingly, library practitioners are acknowledging the importance of KM for libraries. In response to the growing interest of KM among the LIS community, a KM section was created by International Federation of Library Associations and Institutions (IFLA) as a separete unit in December 2003[4]. Since its inception, LIS professionals have expressed a need for a deeper understanding of KM's many dimensions and its relevance throughout the library and information environment.

According to working defintion of IFLA, KM is 'a process of creating (generating, capturing), storing (preserving, organizing, integrating), sharing (communicating), applying (implementing), and reusing (transforming) organisational knowledge to enable an organisation to achieve its goals and objectives[5]. Further, IFLA clarifies that the term knowledge is not limited to published information; it also covers tacit knowledge (expertise), implicit knowledge, explicit knowledge, and procedural knowledge.

There is an ongoing debate among the LIS community on whether KM is a completely new discipline or simply re-branding of librarianship or Information Management (IM). Librarianship is a discipline which deals with the collection, organization and dissemination of recorded or explicit knowledge[6] which, acooroding to Townley[7] has been the primary focus of libraries. They have also developed and applied new principles and techniques in reference, cataloguing and other library services to encourage the creation and use of knowledge[8]. According to Sarrafzadeh[9] librarians operate as intermediaries between people who have knowledge and those who need to know. There seems a considerable overlapping of the tools, terminology and techniques used in librarianship, IM and KM as emerged from the review of litertuare. This overlaps include in the use of tools (databases, internets, collaborative tools, etc.) and concepts (information audit vs knowledge audit, information mapping vs knowledge mapping, etc.)[10,11,12]. Thus, from this point of view, KM can not be considered different from librarianship and IM.

There is also a strong view expressed within the LIS literature that KM is a distinct field from both librarianship and IM, because the focus of KM is on managing tacit knowledge which embeded in employees in the form of their experience, know how, insight and expertise. According to Owen[13] the focus of IM is on information as an object and on explicit and factual information which is managed through the support of IT systems to facilitate the internal processes and ensures the quality of business operations. While the focus of KM is on knowledge as a concept and on tacit knowledge embodied in employees and in the organization as a whole to facilitates knowledge-rich relations and to ensure ongoing development and innovation. The difference between KM and IM in the context of libraries was explained by Broadbent[14], who describes KM in libraries as not about managing or organizing books or journals, searching the Internet for clients or arranging for the circulation materials, but rather these activities may be considered as parts of the KM spectrum and processes. Due to the increased focus of KM on people and their expertise, some researchers highlight the importance of creating social knowledge networks such as online forums, discussion groups and communities of practice for sharing of knowledge[15,16]. But according to Kebedethese[17] these tools and practices are not much in practice among LIS professionals and they are reluctant to use them in their profession.

In spite of different opinions and perceptions of LIS community towards KM, there appears a widespread recognition within the LIS literature that KM is relevant to the interests of the LIS profession. Most authors consider KM from more positive viewpoints and call for full involvement of LIS professionals in KM[18,19,20,21].

Scope of KM in the LIS Profession

Mainstream KM literature indicates that the application of KM contributes to the improvement in organizational performance, economic success in the market place, organizational creativity, operational effectiveness, quality of products and services and economic sustainability[22,23,24]. While, the value of KM in the LIS profession has been recognized as:

- Survival factor for libraries to overcome the challenges library professionals are facing in the changing and competitive environment[25].

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- Solution for the improvement of future prospects of libraries[26].
- Method for improving knowledge-based services for internal and external users through creating an organizational culture of sharing knowledge and expertise within the library[27].
- Solution for the development and application of the organizational knowledge to improve library operations and services[28].
- Means for the transformation of library into a more efficient and knowledge sharing Organization[29].

here is a group of scholars who strongly argue that librarians, on e basis of their skills of information handling, can apply and corporate KM practice in several areas of an academic library cluding administrative and support services, technical services ataloguing, classification, indexing, etc.), reference and formation services, knowledge resource management, source sharing and networking, information technology velopment and application[30,31,32,33,34]. Gandhi[12] explains the rly efforts of reference librarians in capturing tacit knowledge rough old information tools like card-files of frequently asked estions. While these traditional practices are in many cases ntinue to be important, but they are no longer enough to meet e changing KM needs of libraries. Recent development in Web .0 technologies has provided an excellent platform to meet this ed. Increasingly, librarians are using blogs, wikis and other eb 2.0 applications for knowledge sharing purposes[35,36,37].

pportunities and Threats for LIS Professionals

here is strong view within LIS literature that KM expands the rizon of LIS and offers a number of opportunities for LIS ofessionals. An increasing number of job opportunities with w job titles and positions have emerged from KM. Ferguson[38] und some positions for LIS professionals in KM environment m the 'sample job description' compiled by Bishop[39] which clude competitive intelligence leader, knowledge and formation manager, intranet content manager and knowledge ordinator. Malhan[40] argue that the new roles of knowledge ofessionals in knowledge-intensive organization are more or ss the same as the current job titles and activities of librarians d other information professionals. These new roles and nctions are: knowledge engineer, knowledge editor, owledge analysts, knowledge navigator, knowledge ekeeper, knowledge brokers, and knowledge asset managers. , there is no evidence within LIS literature that librarians are ell placed to take advantage of this opportunity to contribute to e organizational success; instead graduates of business schools, rticularly those with an information systems background, are fically well placed to play significant KM roles[22]. The findings LIC/TFPL research indiacte the importance of IM skills in a KM vironment, but people employing these skills in a knowledge vironment do not necessarily come from the LIS profession[41]. A nadian study by Ajiferuke[3] looked at the role of LIS ofessionals who are members of the Special Libraries sociation. More than eighty percent of those working in mpanies that are engaged in KM activities are involved in KM tiatives. More than half of these consider themselves as key embers of the team; although very few are in leadership roles.

The opportunities emerged from the emergence of KM has also been seen as challenge for the LIS professionals. The challenges for the LIS professionals lie in applying competencies used in managing information to the broader picture of managing knowledge[39]. Sarrafzadeh[25], if LIS professionals remain reluctant to gain new skills, they will become irrelevant to their organization and will probably lose out in competition for employment to people from other fields. The most often mentioned challenges to the successful application of KM in libraries are: lack of sufficient skills and competencies, reluctance of library professionals to accept the change, misunderstanding of KM concepts, lack of knowledge sharing culture, lack of incentives or rewards for innovation and sharing of knowledge, lack of top management commitment, lack of collaboration and lack of resources (finacial, technological and human)[42,43,44,45].

Knowledge Management Competencies Required Among LIS Professionals

There is widespread recognition within LIS literature that LIS professionals are lacking adequate exposure and knowledge of the essence of KM and thus find it difficult to actively contribute in any meaningful way to the ongoing debate as well as to the advancement of KM. They are facing difficulty to understand the key concepts and the distinct dimensions of KM. They, by and large, lack the necessary expertise to engage in exploring and practicing KM[17,9]. Since the focus of KM is more on human as well as organizational issues, different types of skills and competencies are needed for library practitioners to work in KM environment.

Some authors have identified the requirement of competencies among LIS professionals for their involvement in KM practice. Investigating the requirement of KM skills for effective integration and use of internal knowledge, Abell[18] observed that LIS sector needs to develop a range of interpersonal and business skills in its staff to add value to a knowledge-based environment. Koenig46 highlights the importance of both LIS traditional skills in the information environment with skills in indexing, cataloguing, authority control and database management for the organization and structuring of information and knowledge as well as additional skills in the business environment with the managerial, leadership and interpersonal skills for leveraging intellectual assets throughout an organization, fostering innovation and change and developing organizational culture of sharing knowledge. Rooi[47] argue that librarians have the opportunity to play an important role in KM on the basis of their training and experience developed and used for many years. However, they need to extend and renew these skills and link it with the processes and core operations of the business in order to be successful in KM practice. Morris[48] also points out that LIS professionals have already posses the essential theoretical and practical skills to work with KM. They have opportunities to use these skills in creative and imaginative ways to influence information strategies at boardroom level and corporate decision making, but they have to gain other skills related to management, business, information and communication technology to take advantage of the emerging roles in the knowledge economy.

Researchers have investigated the requirement of competencies for LIS professionals to involve in KM practice[49,50,51,3]. Based on the findings, they proposed several types of competencies for the successfull application of KM practice in libraries, which may be

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grouped into the following broad categories:

- People-centred skills (communication, facilitation, coaching, mentoring, networking, negotiating, consensus building and team working skills).
- Skills associated with the management of organization as a whole (cultural, leadership, strategic and restructuring skills).
- Information processing and management skills (developing knowledge taxonomies, organizing knowledge resources on Websites and portals and understanding of information and knowledge need of users).
- Skills related the use and application of IT.

FINDINGS

- The concept of KM was emerged in business sector, now it is being used in public sector organizations including academic institutions and their libraries.
- Libraries are having explicit as well as tacit knowledge embeded in working processes and experienced employees.
- Management of knowledge helps an organization to improve the quality of services.
- The perceptions of KM among LIS profesionals are varied and they mostly view KM as the management of recorded knowledge, rather sharing and using tacit knowledge embeded in employees.
- LIS professionals have positive attitudes towards the application of KM in libraries and see it as a best method of improving library functions and services.
- The skills of LIS professionals in indexing, cataloguing, authority control and database management are considered relevant for KM, but they need some additional skills in the business environment with the managerial, leadership and interpersonal skills.
- KM offeres potential opportunities for LIS professionals from their involvmnet in KM including personal career development and enhancemnet of the position and status within their parent organizations. However, if LIS professionals remain reluctant to change their mindset and gain new skill, they will become irrelevant to their organzation and will probably lose out people from other fields in the competition for employement.

CONCLUSION

Though the concept of KM emerged in business sector, but its practices have now been used in the domain of non-profit and public sector organizations, including academic institutions and libraries. Recently, LIS professionals have started to acknowledge the importance of KM. The commonly-held the view is that a library is a knowledge-based organization where the organization and maintenance of recorded knowledge is a practice as old as civilization itself.

In spite of having narrow perceptions towards KM, there is a developing interest in KM among LIS community. This conclusion may be drawn on the basis of three major sets of perceptions emerged from the review of literature. First, that LIS community can and should enter into KM roles through the application of their traditional skills related to IM. Second, that there are potential benefits for LIS professionals from the involvement in KM including personal career development and enhancement of the position and status of LIS professionals within their parent organizations. Finally, that KM offers potential benefits for the development of libraries. However, the success of KM initiatives requires additional skills and competencies among LIS professionals which they are lacking. They must gain organizational political understanding, understanding of business practices and leadership skills for their involvement in KM.

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Application of Cloud Computing in Libraries

Anna Kaushik* and Ashok Kumar**

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*Deputy Librarian
University of Kota
Kota- Rajasthan
**Librarian
MM University
Mullana- Ambala

Corresponding Author
Anna Kaushik
drkaushikanna@gmail.com

ABSTRACT

Cloud computing technology came up as a boon for libraries and is offering various opportunities for libraries to connect their services with clouds. The paper presents an overview of cloud computing and its possible applications that can be clubbed with library services on the web based environment. This study may be helpful in identifying and generating cloud based services for libraries.

KeyTerms: Cloud Computing, IaaS, PaaS, SaaS, Models of Cloud Computing, Grid Computing, Unified Computing.

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TRODUCTION

present scenario, web enabled technologies developed on ual platforms and generating large opportunities and virtual ns to use their services for the various purposes. Nowadays, ud computing is emerged as one of the most popular virtual nology for libraries to deliver the services in an effective nner. Cloud computing contains features of different nologies including utility computing, grid computing, ied computing, web 2.0, service oriented architecture and so . Cloud computing technology is offering great advantages for raries to connect their services not only promptly but also in formats with the flexibilities such as pay as you use model, ess any where any time and so on. Nowadays libraries are ng cloud computing technology for enhancing the services by ding more values, attracting the users and cost effectiveness. In cloud computing environment, clouds are vast resource pools n on demand resource allocation and a collection of worked features. The new concept of cloud and libraries has erated a new model called cloud libraries. Though the usages loud computing may vary with the libraries nature, services d information needs but most common usages of cloud mputing with in libraries can be development of digital raries, corporate cataloging, acquisition, storages and sharing resources on virtual environment on the web. The need of ud computing may occur due to the information explosion, blems in accessing the information, save the time of the users d staff, resource sharing problems, problems in library resources management, complex demand of users and attraction of users towards cutting edge technologies.

What is Cloud Computing?

Cloud computing is not a new technology that suddenly appeared on the web but it is a new form of computing. Cloud computing is a kind of computing technology which facilitates in sharing the resources and services over the internet rather than having these services and resources on local servers/ nodes or personal devices. The combination of servers, networks, connection, applications and resources is defined as 'cloud'. Cloud computing is acting as a resources pooling technology for accessing infinite computing services and resources as per demand of users and can be compare with models of pay as you use or utility model same as used for mobile services usages and electricity consumption.

Wikipedia[1] claimed that the concept of cloud computing was emerged back to the 1960s, when John McCarthy opined that computation may someday be organized as a public utility. Chellappa gave the first academic definition of the term Cloud Computing in 1997 and later on, in the year 2007 the term cloud computing came into popularity and firstly was used in this context when Kevin Kelly opined that eventually we will have the inter-cloud, the cloud of clouds.

NIST[2] provides a very good definition of cloud computing as cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing

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resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.' Buyya[3] defined 'Cloud computing is a parallel and distributed computing system consisting of a collection of inter-connected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on Service Level Agreements (SLA) established through negotiation between the service provider and consumers.'

The common characteristics of cloud computing noticed from above definitions are:

- Pay Per Use (No Ongoing Commitment, Utility Prices)
- Elastic Capacity and the Illusion of Infinite Resources
- Self Service Interface
- Resources that are Abstracted or Virtualized.

LITERATURE REVIEW

Various studies were conducted on cloud computing and libraries related issues such as Khan[4] provided the concept of cloud computing and also highlighted that how libraries can be benefited using cloud computing technology by providing some live examples. Pandya[5] investigated the implication issues of cloud computing in libraries on the basis of SOWAT analysis and pointed out the strengths, weaknesses, opportunities, and threats associated with cloud computing and libraries. Goldner[6] expressed the view with regard to cloud computing, how cloud computing is differed from the other computing and its advantages to libraries in three basic areas: Technology, data and community. Srivastava[7] presented the vision of cloud computing with various commercially cloud services available on the Infrastructure as-a-Service (IaaS) and found that cloud computing is changing the way towards hardware and software for on-demand capacity fulfillment and development of web applications to make business decisions. Murley[8] provided an overview of cloud computing and list of resources and services may attach with cloud computing technology particularly in law libraries and also stated that cloud computing is not new for law libraries. Sasikala[9] argued the concept of cloud computing from the perspectives of diverse technologists, services and models available, cloud standards, cloud in government, enterprises and higher education, along with opportunities, challenges and implications on the basis past, present and future situation. Goyal[10] defined the benefits and comparisons of cloud computing services on the parameters of pricing, maximum limit, data security, data backup. This paper also includes the advantages and disadvantages of cloud computing. Jordan[11] expressed that cloud computing technology are clubbing with libraries services and web scale services are developing on the web in order to present the library services when and where required the users by example of Online Computer Library Center (OCLC) services. Wang[12] examined the trends of cloud computing on the basis of extant information systems literature, industry reports and practical experience reflections and also pointed out the significance of cloud computing and its implications for practitioner and academics.

OBJECTIVES

- To define the concept of cloud computing.
- To discover the library services that are clubbing with cloud computing technology.
- To investigate present situation of Indian libraries in order to adopt cloud computing into their library services.

Models of Cloud Computing

Service Models

Though, there are various service models originated on the web but three service models widely used for delivering the different cloud based services that described below:

Infrastructure as a Service (IaaS)

This service model comprises a wide range of features, services and resources which support to build an virtual infrastructure for computing. Organizations can be developed entire infrastructure on demand. e.g. Amazon Web Services, Rackspace, Savvis, HP, IBM, Sun and Google Base.

Platform as a Service (PaaS)

Platform as a Service model helps in generating the computing platforms to run the software and other tools over the internet without managing the software and hardware at the end of user side. Amazon Elastic Cloud, EMC Atmos, Aptana and GoGrid are the examples of PaaS model which providing platforms to users in maintaining and supporting their IT infrastructure without spending huge amount for buying hardware, software and related technology.

Software as a Service (SaaS)

In this model, users can avail the facilities to access and use any software available with cloud vendors. However, it is not necessary for the users to buy the software, install and run, maintenance the applications on their own servers. The cloud users need not to manage the cloud infrastructure and platform on which the application is running. This service model provides online email applications, free services, limitless storage, and remote access from any computer or device with an Internet connection.

Deployment Models

Currently, four types of cloud deployment models have been defined in the cloud community:

Private Cloud

This kind of deployment model solely developed and managed by a single organization or a third party regardless whether it is located in premise or off premise. There are several reasons behind the development of private cloud for an organization some key reasons include optimize utilization of existing in-house resources, security concerns including data privacy and trust also make private cloud an option for many firms, data transfer cost from local IT infrastructure to a Public Cloud is still rather considerable, organizations always require full control over mission-critical activities that reside behind their firewalls and for research and teaching purposes.

Community Cloud

It is a joint venture of several organizations come together to

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build a cloud infrastructure as well as policies through which cloud services will be rendered. This type of cloud deploy model helpful in developing of economic scalability and democratic equilibrium. In the community cloud model, cloud infrastructure may be hosted by a third party vendor or within one of the organizations in the community.

Public Cloud

Public cloud is meant for general public use and open to all. This kind of deployment model of cloud computing is developed by any cloud computing agency and having own policy, value, and profit, costing, and charging model. Some popular public cloud services include Amazon EC2, S3, Google App Engine and Force.com.

Hybrid Cloud

This type of cloud made from more than one cloud deployment models that may be public, private, community and other models also, bound together with by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds). The Hybrid cloud model is widely used by institutions and organizations because this model provides more facilities and flexibilities in making optimum use of their resources and accomplishing the tasks.

Applications of Cloud Computing In Libraries

Libraries are shifting their services with the attachment of cloud and networking with the facilities to access these services anywhere and anytime. In the libraries, the following possible areas were identified where cloud computing services and applications may be applied:

Building Digital Library/Repositories

In the present situation, every library needs a digital library to make their resources, information and services at an efficient level to ensure access via the network. Therefore, every library is having a digital library that developed by using any digital library software. In connection to cloud based digital library software, Duraspace is having two softwares namely Dspace and Fedora Commons but Dspace is widely used for building digital libraries/ repositories relative to Fedora Commons. Dura cloud provides complete solutions for developing digital libraries/ repositories with standard interfaces and open source codes for the both software.

Searching Library Data

OCLC is one of the best example for making use of cloud computing for sharing libraries data for years together. For instance, OCLC World Cat service is one of the popular service for searching library data now is available on the cloud. OCLC is offering various services pertain to circulation, cataloguing, acquisition and other library related services on cloud platform through the web share management system. Web share management system facilitates to develop an open and collaborative platform in which each library can share their resources, services, ideas and problems with the library community on the clouds. On the other hand, the main aim of web- scale services is to provide cloud based platforms, resources and services with cost benefit and effectiveness to share the data and building the broaden collaboration in the community.

Website Hosting

Website hosting is one of the earliest adoptions of cloud computing as many organizations including libraries preferred to host their websites on third party service providers rather than hosting and maintaining their own servers Google Sites serves as an example of a service for hosting websites outside of the library's servers and allowing for multiple editors to access the site from varied locations.

Searching Scholarly Content

Knimbus is cloud based research platform facilitates to discover and share the scholarly content. Knimbus stands for Knowledge Cloud which is dedicated to knowledge discovery and collaborative space for researchers and scholars. Knimbus was started its journey in 2010 by the entrepreneurs Rahul Agarwalla and Tarun Arora to address challenges faced by researchers in searching across and accessing multiple information sources. Knimbus is currently used in over 600 academic institutions and R&D labs by scholars, researchers and scientists as well as over 50,000 researchers. Knimbus is a collaborative platform for researchers to discover and share knowledge with peers and facilitates to find and access millions of journal articles, patents and ebooks, for the users tagging, sharing and discussing of these contents with their peers. At present, Knimbus proposed a free offer to get registered to empower the libraries for dynamic searching and also for single point search interface, maximizes the usage of all e-resources, customized search across selected sources reduces noise and highlights relevant content and tools to support the complete research lifecycle. Currently, Information and Library Network (INFLIBNET) Centre (http://www.inflibnet.ac.in) has been incorporated Knimbus cloud service into its UGC INFONET Digital Library Consortium in order to search and retrieve scholarly contents attached therein.

File Storage

To access any files on the internet, cloud computing present number of services such as Flicker, Dropbox, Jungle Disk, Google Doc, Sky Drive and so on. These services virtually share the files on the web and provide access to anywhere and anytime without any special software and hardware.

Therefore, libraries can get advantages of such cloud based services for various purposes. For instance, LOCKSS (Lots of Copies Keeps Stuff Safe), CLOCKSS (Controlled LOCKSS) and Portico tools are extensively used for digital preservation purpose by libraries and other organizations.

Building Community Power

Cloud computing technology offers great opportunities for libraries to build networks among the library and information science professionals as well as other interested people including information seekers by using social networking tools. The most famous social networking services viz. Twitter and Facebook which play a key role in building community power. This cooperative effort of libraries will create time saving, efficiencies and wider

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recognition, cooperative intelligence for decision making and provides the platform for innovation and sharing the intellectual conversations, ideas and knowledge.

- **Library Automation**

  For library automation purpose, Polaris provides variant cloud based services such as acquisitions, cataloguing, process system, digital contents and provision for inclusion of cutting edge technologies used in libraries and also supports various standards such as MARC21, XML, Z39.50, Unicode and so on which directly related to library and information science area. Apart from this, nowadays many of the software vendors such as Ex-Libris, OSS Labs are also offering this service on the cloud and third party services offering hosting of this service (SaaS approach) on the cloud to save libraries from investing in hardware for this purpose. Besides cost-benefit, the libraries will be free from taking maintenance viz. software updates, backup and so on.

- **Present Situation of Indian Libraries**

  In India, cloud computing in libraries is in development phases. Libraries are trying to provide to users cloud based services but in real sense they are not fully successful owing to the lack of good service providers and technical skills of LIS professionals in the field of library management using advanced technology. But some services such as digital libraries, web documentation and using web2.0 technologies are running on successful modes. Some good examples of successful cloud computing libraries include Dura cloud, OCLC services and Google based cloud services. Nowadays many commercial as well as open sources venders (i.e. OSS) are clubbing the cloud computing technology into their services and products. However, cloud computing technology is not fully accepted in the Indian libraries but they are trying to develop themselves in this area.

CONCLUSION

This study provides cloud computing concepts and implications of cloud based applications in libraries in order to enhance their services in a more efficient manner. No doubt, libraries are moving towards cloud computing technology in present time and taking advantages of cloud based services especially in building digital libraries, social networking and information communication with manifold flexibilities but some issues related to security, privacy, trustworthiness and legal issues were still not fully resolved. Therefore it is time for libraries think seriously before clubbing libraries services with cloud based technologies and provide reliable and rapid services to their users. Another role of LIS professionals in this virtual era is to make cloud based services as a reliable medium to disseminate library services to their target users with ease of use and trustworthiness.

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Measuring Information Quality: Concerns on the Use of Bibliometric Studies

Ali Amour El-Maamiry and Mohammad Abid Ghauri

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University of Dubai
Dubai, UAE

Corresponding Author
Ali Amour El-Maamiry
aamour@ud.ac.ae

ABSTRACT

Bibliometrics is the set of mathematical and statistical methods used to measure and analyse the quality of books, articles and other forms publications[1]. There are three types of bibliometric indicators that are used to measure the quality of the work: Structural indicators, which measure the connection between author, publication and area of research, quality indicators, which measure the quality of researcher's output, and Quantity indicators, which measure productivity of a particular research. This paper provides an overview of currently used indicators to measure the quality of information and summerises the critical elements that caution evaluator of the quality of information. Bibliometric method of measuring quality of information is inappropriate and can easily overestimate the researchers' performance based on the structural indicators and quantity indicators while ignoring the quality of researcher's output. Hybrid of traditional bibliometric method and full text mining model should be used. There is a need of information professionals to act beyond the bibliometrics in providing services.

KeyTerms : Bibliometric Method, Text Presentation Method, Co-word Analysis Method.

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INTRODUCTION

fore looking at the bibliometrics, we have to look on what is lity information? It is simply meeting users' expectations. rary users have conformance expectations from reference rarians or information professionals whether are formal or rmal. Bibliometric is the tool used to measure the information lity. If you look at the information you will see that information data in context, where data is accumulated facts about the ngs. And so the information quality is the presentation of facts out the information whether is an article, chapter of a book or a ference paper that meet users' expectations or needs. Quality rmation became a powerful tool that assimilated with people.

s peculiar nowadays to seek relationship between ideas, ncepts and problems in science and social sciences by several ys. The traditional way is to seek views of small number of ers (peer review). Bibliometric research is another way of king relationship from quantitative perspective. It is devoted to ntify the number of studies in literature and the use of pirical method like citation and co-citation analysis[2]. ditional bibliometric method of counting author, co-author, rnal and journals citation analyses is analysis based on the tions contained in the scientific paper, but doesn't give you a clear picture of the actual content of the research work[2]. Bibliographic data are those that can be derived collected in different parameters in a document. The document can provide two types of information, tropical information which is document content and peripheral information which can be used as document descriptors. Bibliometric indicators are based on bibliographic parameters or feature. Not all bibliometric indicators can be applied collectively, they are contextual, arbitrary and artificially provided. It is difficult to control them and get better result in analysis.

❑ Bibliometric Methods

Bibliometrics is a set of methods used to study or measure texts and information. Citation analysis and content analysis are commonly used bibliometric methods. It is a generic term for data about publications which includes numbers of articles and publications produced and classified under different headings such as author, institution, subject area, Country in order to create simple indicators of productivity of academic research. While the bibliometric method is mainly used in the field of Library and Information Science but it has significant impact on other subject areas where many research fields use bibliometrics to expose the impact of their fields.

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Data from citation indexes can be analysed to determine the popularity and impact of the specific articles, authors and publication. Information professionals also use citation to quantitatively assess core journals and publications in particular discipline. It means that it is situating the country in relations to the world and is situating institution in relations to the country and individuals in relations to their own community.

Today bibliometrics are used in various fields such as:

- **History of Science:** Whereby it reveals the development of scientific disciplines by tracing the historical movements that are found in the results obtained by researchers.
- **Social Sciences:** Whereby examining scientific literature, it supports analysis of the scientific community and its structure in a certain society as well as networks of researchers.
- **Documentation:** Whereby counts the number of journals per library and identify the journals that constitute the core, secondary sources and periphery of the discipline.
- **Science Policy:** whereby it provides indicators to measure productivity and scientific quality by supplying a basis for evaluation or orientation of R & D.

Bibliometrics techniques in fact are counting papers in attribution to country, institution and author, on one hand. On the other hand they are counting citations to measure the impact of the work in scientific community, the counting of co-citation to measure the number of times that two words are cited together in a single paper. Results of this process are presented in various forms, such as mapping, so that they establish relationships with participants and expand the means by analysis.

Bibliometric Indicators

Biblimetric indicator is a device based on bibliographic information used to measure and assess scientific intellectual activity of and individual, country and so on. There are three types of bibliometric indicators. Firstly quantity indicators which measure the productivity of a particular researcher. Secondly, quantity indicators which measure the researchers output performance and thirdly structural indicators which measure the relationship between publications, authors and areas of research. The discussion here will be mostly based on two types of indicators. Firstly, quantitative indicators of science and technology activities and secondly the structural indicators that are mostly used to measure relations between scientists. It is highly used numerous parameters in analysis such as scientific literature, co-authorship, patents, citations, co-citations and co-words that indirectly measures the scientific community. Bibliometric indicators cannot capture all knowledge production in a society and inform us of its quality[3].

Quantitative Indicators

- **Number of Papers:** This indicator reflects the scientific output based on paper count of a single scientist, a school, a laboratory, a local/international research team or a country. The number of papers produced in a particular discipline or country constitutes by default the bibliometric indicator. It is advisable to use this indicator to measure a discipline, or country when the number is high, but it is difficult to measure individual author, quantity or quality of the content of research work.
- **Number of Citations:** This indicator is used to measure the impact of research work in the community. Basically authors cite each other either to acknowledge the earlier work in the field or to highlight the previous work in conjunction with the present. Authors cite works from their community which highly influence their research. It is difficult for researchers to cite unknown author in their work. Bias in citing is available, and there are many motives behind citing. Some authors are citing their own works that mainly increase their number of citations which they will be credited for.
- **Co-authorship:** Number of papers co-authored is an indicator to show the cooperation amongst researchers at individual leveland national or international level. It is used to measure the volume of works carried out by teams of researchers at institutional or national level growth or decline. Co-authorship has ambiguity caused by diversity counting methods, how participation of authors in scientific work can be measured?

  Is it 'fraction' or 'whole'? The problem here is how to deal with a number of authors from different countries. The work is co-operative in nature, can all individuals assigned full credit for their share? For the country engage in four country collaboration form will it get whole link or part link (quarter link)?

  Some bibliometricians are counting full credit and some are counting fractional credit.It is difficult to count fraction of credit and present it. Theoretically, the author's affiliation is credited here (working place) rather than his home country as always address written is currently working place and not home town (country).
- **Number of Patents:** Patents constitutes the initial legal protection for the invention developed by firms, institutions or individuals. This can be used as an indicator to measure innovation and technological capacity level of firms, industries and nations. So, patent statistics are used as science and technology indicators which have number of elements that are used in bibliometric analysis. The critics come in here in terms of diversity, not all patents have the same significance in terms of technical innovation and quality economic needs. It is not prudent to compare diverse patent applications for technological innovations with different industries.
- **Database Coverage:** It is impossible to measure scientific publication trends for a number of years using databases that change from one year to the other. Bibliometric methods need to progress more so that can be represented widely as some scientific journals cease, some change their names or merge with each other and on top of all new emerge.

Structural Indicators

- **Co-publications:** This indicator measures interactions and scientific relationships between countries, institutions, laboratories, research teams and networks. The result of co-operation between representative of each entity and each country taking part in particular research programme pose links between parties. The count may forge a problem in institutions participation of country's production. Would it be in fraction or whole, will it be well representing correctly the required?

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Affinity Index: This indicator is used to measure activity of scientific exchanges amongst countries within timeframe and in relation to all international cooperation between the same countries. It shows the strongest area as well as weakest area of these two chosen countries. It requires having mass of scientific cooperative links during the period and preferably among the countries with similar scientific mass.

Scientific Links Measured by Citations: This indicator measures networks' influence amongst the communities which normally traces networks of influence between scientific communities such as interactions, peer evaluations etc. It is limited to works that cited in well known authors or journals. Nothing is included of newly emerged journals in process.

Co-citations: This indicator measures a number of times that two papers are cited simultaneously in the same article. It shows the scientific community's reaction to the research work. It provides an extremely selective analysis because it describes only a part of process of assembling knowledge.

Co-occurrence of Words: It is measuring the frequency of certain given terms of a particular field used together in the article or patent. In the scientific research, the presence of common words of the field represents likeliness of intellectual research. It is a very useful tool to correlate the texts but it has no micro level analysis. Words have no systematic mapping system and the result may not be perfect. Co-word doesn't reflect the real results of relation.

Visual Representation Techniques: Since it is difficult to present and capture the tables composed of many figures, different methods are based on multidimensional analyses like minimum spanning trees, correspondence factorial analysis and so on are used to map various interpretation of bibliometric data. It facilitates to depict structure of research in various fields. It is impossible to present multidimensional system in two dimensions without losing information. As it is difficult combining various techniques to represent all data of multidimensional structure. Loss of data is a must although it can be minimized.

Text Presentation Method

ere are several bibliometricians that made excellent cases on credibility of using bibliometrics in evaluating individual entists or country or even region. In using bibliometric data in easuring central aspects of research development or nstructing research groups, University departments and nitutes, Van Raan established strong case on this issue. He aimed that beside peer review, these indicators are dispensible in evaluating research and can be used parallel in ocesses[4]. Van Raan suggested 9 indicators for German Medical search some of which are used to uniquely evaluate the impact research group and establish relationship between them. These dicators are Articles (P) and Citations (C), so the ration between ations and articles (CPP) and the mean Journal Citation Score n be used to construct a set of indicators that can be used to ess international research performance.The scale-dependent indicators are constructed by the class indicators at can be used to normalize scaling relations. This may increase rmation professionals' confidence in the indicators that are ful to evaluate research performance.

The idea of studying full text of scientific literature by using mathematical models and combination of those tools such as scientometric, webometrics and informetrics, along with bibliometric method, is not new. It has its roots with co-word analysis that orchestrated by Callon for the purpose of evaluating research works. Braam and Van Raan suggested the using of co-citation and word analysis in context of bibliometric analysis to improve efficiency of co-citation clustering. This includes the use of word profiles of publication based on indexing terms and classification code.

Many of the early studies of text analysis were based on descriptors like indexing terms, subject headings or keywords extracted from titles and abstracts. The major hypothesis underlying in this method is that high similarities is equal to strong relevance of scientific work based on Latent Semantic Indexing (LSI). The surprising effect of LSI is the fact that synonyms or different term combinations describing same concepts are mapped together based on common context that they generally appear. Besides absolute relating synonyms in full text model, the problem of polysemy is partially addressed by LSI.

Co-Word Analysis Method

At the level of individuals, bibliometric method measures the productivity of research, but doesn't inevitably say anything about the quality or the competence of researchers. Researchers consider peer review (a small number of experts in the field) the only way they should be judged. This view is shared by a large portion of the scientific community at the present time.

Some scientists have proposed that they shouldn't be judged in job application on a list of publication taken from anonymous database, but on selected articles those themselves think to present their work. This reaction is quite natural and underscores the need for interaction between the people evaluated and the ones who are evaluating[1]. In fact there are other methods that can be used in bibliometric such as citation and co-citation analyses which are devoted mainly to qualitative studies whereby frequency of occurrence and co-occurrence of the earlier literature work and later matters. The main information here is author co-citation, journal co-citation; keyword co-citation and so on can produce significant proof of relatively scholarly work in the number of points like authors, journals and textual content.

Co-word analysis constituted by the assumption that, the keywords produce adequate content information of any research theme and its relation in treating a related problem in the field or topic. So two keyword co-occurrence within the same papers it is an indication of linkage of topics that researchers refer to. The presence of many keywords around the same papers or pair of words reveals the strategic alliance of research work that may correspond in the research theme. This method discloses the patterns and trends in a specific discipline by measuring strengths of term representative of the relevant research work or publication which can also measure the anticipated quality of the work. The main feature of co-word analysis is to visualize the intellectual structure of specific discipline in the maps of conceptual structure of the field. The higher co-occurrence of the two words in the document the closer relationship is between them.

There are two ways to extract keywords of journal articles, conference papers, reports, research works etc. One way is to

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extract from keyword list, titles, abstracts and subject. Professional indexers select descriptors which are standardized to eliminate different spellings and variants of the same terms. One of the most momentous reservations of using controlled vocabulary is that volatility of indexer's effects on descriptors selection that may vary from one indexer of the database to the other indexer of the other database. Although professional indexers' experiences assure standard application of that taxonomy, it is still volatile to have fixed system of common nomenclature.

Another way of extracting keywords is extracting directly from full text documents by using some software such as NPtools, LEXIMAPPE, Bib Tech Mon, CAIR etc.[5]. Words or phrase of proper frequency are chosen as a subject of co-word analysis to represent core topics in the specific field. This method was chosen to avoid negative efforts of professional indexers and time problem of thesauri, but it still is difficult to maintain and keep abreast of new trends and development in the field.

DISCUSSIONS

In more than a half century bibliometrics has secured its place as an instrument of measuring science in the world. However, in all countries bibliometric method has taken long time to get acceptance as measurement of science, in political as well as in scientific cycles. Many scientists are not aware of the methodology and are not easy to accept evaluation.

Bibliometrics is very constructive where it can help to change the data and method used in research, but can easily affect interpretation of the results.

The UK government is considering using bibliometrics as a possible auxiliary tool in its Research Excellence Framework, a process which will assess the quality of the research output of UK universities on the basis of the assessment results, research allocations etc.

At individual level, bibliometric method measures the productivity of researcher, but it doesn't say anything about the quality of the work or competence of researchers in their fields. It is difficult to make a hike of measurement of a scale of a country or discipline by evaluating individual researchers.

Another reason is that no one knows how many journals are published, and there is no agreement of defining what is journal? Mostly international scope implies where the coverage is inappropriate[6]. Works published in local journals and in local languagesthat address the national problems and interests are not covered by the so known science citation databases.

Bibliometric indicators do not represent all published works in all languages. Many databases (Chemical Abstracts (US), Compendex (US), Embase (Dutch), Inspec (UK) Pascal (France) and Science Citation Index (US) are categorized as a full scope coverage of research and development. Mostly compiling journals that are written in certain mainstream languages such as English, French and Dutch while journals written in other scripts of languages, are ignored and so are their scientists. Although these databases have certain like of international coverage, but they have an amount of linguistic bias on non-English scripts are not presented even partially. Next to that Anglophone, Francophone and other authors tend to hamper access to authors to those countries who have difficultiesin reading other languages or lack of translation resources as it will be difficult for an Anglophone author to have impact on Francophone author and vise versa.

Many Asian and Arab countries are using the impact factor of the journals in which the scientists publish in evaluating, promoting and even hiring. Even though the impact factor of the journal is inappropriate to measure an individual achievements. Young scientists and fresh graduates are deeply abjured by using these metrics as they reflect the quality of the mentor more than of a graduate.

Citation counts, is the number of references to publication, that doesn't indicate anything about the 'quality' of the work itself. Ideally, the information professional would like to know which work is of high quality research so that it can be present to a searcher. Citation counts, give us only indication of the impact of research paper to the society without elucidating the quality of the work itself.

CONCLUSION

The bibliometric indicators can possibly be used in indicating the research excellence of countries, institutions and individuals, but the selection of the right indicator remained complex to overcome. The use of bibliometrics in the present and near future is difficult to revise, as it is easily computable with less cost. Although new metrics assure more accuracy in analyzing individual performance but still based on publications and citations which indicating nothing on researcher abilities and mentoring which have the equal importance in judging the performance. Hybrid methodologies combining text presentation and co-word analysis may prove to be valuable tools to facilitate endeavours of quality information in libraries as both give same weight to articles cited or not and all kind authors. Many indicators are static in nature, we need to have dynamic indicators that can overcome the changing nature of bibliographic data and used by all databases.

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Automation and Networking Status of Aided Minority Degree College Libraries in Urban Bengaluru: A Study

Umesh Kumar Y

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Associate Prof. & Head
Library & Information Centre
Hasanath College for Women
Bengaluru- Karnataka

Corresponding Author
Umesh Kumar Y
umeshkumary@yahoo.com

ABSTRACT

The impact of ICT on the Library and Information Centres, library developments, especially Library Automation, and networking, is vast and significant to a great extent. The academic libraries are on the threshold of a globalised era of profound and exciting transformation. The author has undertaken a study to determine the status of automation and networking in the aided minority degree college libraries of Bengaluru. The author finally concludes that in order to survive in this globalised environment, the college library professionals should acquire the professional skills and technological competencies which are very essential in the present day and consider how best these can be adopted to their libraries, to survive in this changing technological environment thereby meeting the future challenges of the 21st century.

KeyTerms: Library Automation, Networking, ICT, Digital Libraries, Libraries Services, Information Systems, Library Software, Information Resources.

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INTRODUCTION

Library Automation in a simpler term is defined as a process of mechanization of Library operations which are of a routine and repetitive nature which usually covers all the housekeeping operations of the library and information centre. Library automation is the use of computers to control processes and replacing human operators. It is the technology concerned with the design and development of process and system that minimize the necessity of human intervention in their operation. It refers to the computerization or mechanization of all the library activities, such as acquisition, circulation, cataloguing, serials and OPAC (Online Public Access Catalog)[1].Thus an automated library system usually consists of a number of functional modules, such as acquisition, circulation cataloging serials, and an OPAC in which all these functional modules share a common bibliographic database. Networking is the linkage of working procedures for the exchange of information resources.

Library automation and networking is all about connecting to other libraries and information centres, search engines, peer groups, databases and experts[2]. The NAAC has recommended that many academic libraries go in for Library Automation and Networking for better services and quality in higher education. Similarly the National Knowledge Commission has also recommended to the Libraries to modernize their services.

Although IT application in college libraries is no doubt a Boon, its implementation is a most challenging job, especially in aided general degree colleges as they face a lot of constraints like shortage of manpower, lack of proper training, and personnel motivation[3].

The emerging ICTs in India have changed the traditional libraries into knowledge centres and librarians function more like consulting information officers or knowledge managers. However the situation in the degree college libraries in India is different and many are not in a position to fulfill their objectives. The reasons may be like, lack of good library policy, high rate of unplanned growth, irrelevant collections and storage, unqualified staff, inefficient retrieval system, diversion or unscientific use of funds and lack of support from the management and authorities[4].

Challenges of Library Profession in the 21st century are:

- Planning and implementing of the high quality library and information services in the changing social and technological environment of the 21st century.
- Organizing libraries, media centres and information agencies to serve the users effectively.
- Designing information systems that meet specific needs of library and information users.

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Integrating information technologies creatively and effectively into library and information services.

Developing techniques to organize and retrieve vast and enormous amounts of information due to knowledge explosion.

Sharing information resources through innovative networking and library automation and ensuring equitable access to a broad range of information.

EEDS AND PURPOSE

e main motto of library automation is to provide the right ormation to the right person in a right manner in right time. The dvantages may be in different levels which are as follows:

Library cataloguing system

Reduced staff

Increase in the staff productivity

Housekeeping operations

Advance in technology

System hardware and software

Access to external information through internet

Meets specific needs of library and information users

TERATURE REVIEW

fficient studies have been undertaken regarding Library omation in academic libraries. Some of the studies which are erred as regard to literature review are as follows:

sode[5] have reported on a study of 23 college libraries in Goa, a. Out of which only 4 colleges had fully automated, 5 eges had partially automated and 14 colleges were in their y stages of library automation. The study found that majority he libraries lacked the trained staff that was required for library omation, along with other common problems such as fficient funds, lack of trained staff, and lack of space. Mulla[6] veyed the automation Status and activities of engineering ege libraries of Karnataka. The status of automation packages d by various libraries and opinions of the library Professionals out the performance of different modules of software used in r Libraries, with findings that most majority of the libraries had d ICT infrastructure. Maheshwarappa[7] studied the extent of ilability and use of computers in Karnataka. The study found t out 571 colleges, only 121 colleges had computers and of ch only 45 colleges were using computers for library in-house ivities. Also found that the college libraries in Karnataka state owed a pathetic picture in the use of computer skills, etc.

m the review it was found that no such survey or study was ducted in Bengaluru colleges. Hence as a first step an attempt been made by the author in undertaking a study on the status brary automation and networking in Aided degree college aries of Bengaluru. Thereby contributing a bit of information he already existing knowledge resources related to the topic brary automation.

BJECTIVES

To study the present status of the selected aided minority degree college libraries.

- To know the status of library automation and ICT in the selected colleges.
- To find out the library software used in the automation of the libraries.
- To ascertain the status of library network undertaken by the colleges.
- To understand the problems of professionals in the process of automation and networking.
- To find out the availability of computer systems used in the process of library automation and its services, and library website address of the colleges.

SCOPE OF THE STUDY

The Present study is limited to the aided minority degree college libraries situated in Bengaluru only. For the purpose of the study both religious minority and linguistics minority have been taken into consideration, which include Christians, Muslims, Buddhists, Sikhs, Maratha, and Jain institutions.

The following is the list of Aided Minority Degree colleges selected for the study:

Table 1: Aided Minority Degree Colleges

College	Minority Status
Abbas Khan College	Muslim Minority
Al-Ameen Degree College	"
Ambedkar Degree College	Linguistics Minority
B N M Degree College	Maratha Minority
Hasanath College for Women	Muslim Minority
Hasanath Degree College- Hennur	"
Jyothi Nivas College	Christian Minority
Mount Carmel College	"
RBANMS Degree College	Linguistics Minority
St. Josephs College of Commerce	Christian Minority
St. Josephs Arts and Science College	Christian Minority
St. Josephs Evening College	"

METHODOLOGY

The researcher has chosen descriptive research design and the method is normative survey, and questionnaire technique. Primary and secondary sources of information was collected from books, journals, magazines, annual reports of the colleges, and conference / seminar volumes that were related to the study.

Printed questionnaire was distributed in person to the 12 identified aided minority degree institutions in Bengaluru and simultaneously the soft copy was sent to the e-mail inbox of librarians who possessed e-mail IDs. Of the 12 questionnaire distributed, all the librarians responded making the response rate as 100 percent. In order to give authenticity to the findings, statistical analysis was carried out. The SPSS package was used for tabulations, simple percentile analysis have been used for analyzing the data

Analysis and Interpretation with Findings

The collected data through questionnaire was analyzed with the help of tables, and data interpretation was done keeping the

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objectives of the study on focus. Various questions were asked relating to the automation and networking in the libraries and the response received from the library professionals are tabulated and presented in the tables below with relevant findings:

❑ Library Automation

Table 2: Status of Library Automation

Status	Colleges	%age
Fully Automated	4	33.3
Partially Automated	6	50
Not Automated	2	16.7
Total	12	100

Library automation and networking is one of the basic quality indicators for college libraries as emphasized by the NAAC and UGC. Table 2 shows that out of 12 colleges only 4 minority colleges have fully automated their libraries, while 6 of them have partially automated their library. Only 2 colleges have not automated their libraries.

❑ Library Software Used

Table 3: Library Software Used

Software	Colleges	%age
Easy Lib	3	30
Lib Soft	2	20
Marif Info System	2	20
E-Granthalaya	1	10
Libsys	1	10
Vergocis	1	10
TOTAL	10	100

Table 3 shows that librarians are using a range of automation software. Among them, Easy Lib Software is used by a large number 3(30%) minority Aided colleges, which is followed by Libsoft and Marif Info System 2(20%) each. The next major group of libraries using the software such as E-Granthalaya, Libsys and Vergocis contribute to 10% each of the total.

❑ Type of Network in Existence

Table 4: Type of Network In Existence

Network	Number of Colleges	%age
LAN	6	50
WAN	4	33.33
Non Availability	2	16.7
Total	12	100

It is found that 6 college Libraries have LAN facility and WAN facility are available in 4 college libraries. There are 2 college libraries not having any networking facilities (not automated) in their library and information centres.

❑ Total Number of Computers Available

The table 5 shows number of computers available in degree libraries of minority colleges. A majority of the college libraries 33.3% are having less than 10 computers, the next major groups of libraries 25% are having less than 5 computers. While two

Table 5: Availability of Computers

Computers	Colleges	%age
1 to 5	03	25
6 to 10	04	33.3
11 to 15	02	16.7
16 and above	01	08.3
Not available	02	16.7
Total	12	100

colleges are having computers between 11 and 15, only one college is having more than 16 computers in their libraries. It is found that many of the minority colleges were allotted less than 10 computers to their libraries.

❑ Availability of Library Website Address

Table 6: Availability of Library Website

Website	Colleges	%age
Yes	4	33
No	8	67
Total	12	100

Having a separate library website is one of the best practices for dissemination of library resources and services to the user community by 24x7 across the campuses for online access. Table 6 shows that only four colleges are having separate library websites. It is quite a surprise to note that the higher educational minority aided institutes surveyed in Bengaluru which are information technology hubs, where the librarians are not encouraged to maintain a separate dynamic library website.

SUGGESTIONS

Based on the findings of the study an attempt has been made to suggest a few recommendations which will help the library professionals, management and the authorities to successfully use the ICT facilities as well as to automate their college libraries

- The minority educational institutions in coordination with the higher education department and the Government should have a quest to change the paradigms of higher education system.
- The managements and the institutions should take up periodic surveys to access the necessary requirements for the implementation of automation and networking in the library and information centre.
- Seminars, workshops, conferences, visits to other libraries and other such information gathering and public relations methods must be made a part of the libraries work schedule during each semester period for undertaking such automation and networking programs for the benefit of the Institution.
- Those colleges which have partially automated their libraries should make efforts to become fully automated and those libraries which are not automated should take an initiation to begin the library automation as early as possible.
- In The context of library automation and networking facilities. It is quite strange that the colleges in such a well

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developed city like Bengaluru are not able to implement the Basic ICT enabled library facilities in their respective libraries, though NAAC, UGC and other quality agencies emphasize on it. This needs to be encouraged by the respective minority college managements.

CONCLUSION

brary automation in the 21st century is on interconnecting stems, sharing information resources through innovative tworking and ensuring equitable access to a broad range of formation and users. These developments include the growth of e use of networks and the internet. Library automation has hanged the definition of the librarian, the library and formation centre. Though many drastic changes have been curring in the field of library and information centres in the ake of rapid information technology procedures, ICT and plosion of knowledge, the minority aided degree colleges of engaluru can move one step ahead to achieve the new horizons rough the implementation of the library automation and tworking in the library and information centres of their stitutions.

e librarians should acquire the professional skills and chnological competencies which are very essential in the esent day and consider how these can be adopted to their raries, to survive in this changing technological environment ereby meeting the future challenges of the 21st century, through rary automation and networking. Also in order to survive in this obalised environment the college library professionals in ordination with the management should make serious efforts to omate and network their libraries thereby contributing to the fillment of the mission of the institution.

ally it is necessary for library professionals to keep a watch on e developments and to choose appropriate technology pending on the needs, and at the same time it is equally portant for the library professionals to interact with the mputer professionals as the Library automation and tworking at all levels needs good co-ordination between both se professionals. Though the latest technology penetration in library automation system is the barcode technology, the digital library, and the RFID security system, Some colleges are yet to take off with the basic library automation process which started in the early 1970s. Let us hope that in the near future to come, all the academic libraries shall be automated and networked. Thus In the changing scenario, there is a growing need to realize the importance of library automation and networking

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Present Status of Library Collection, Staffing Pattern and Services Provided by the Dental College Libraries in Karnataka: A Study

Suryakant B. Kemdarne

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Librarian
Ashokrao Mane Group of Institutions
Kolhapur- Maharashtra

Corresponding Author
Suryakant B. Kemdarne
suryakant_kemdarne@rediffmail.com

ABSTRACT

This article is focused on present status of library collection, ICT skills, staffing pattern and library services provided by the dental college libraries in Karnataka. The survey findings mainly cover various aspects of library collection, ICT skills, staffing pattern and services provided by the dental college libraries, such as library collection, ICT skills, staffing pattern and library services. The Questionnaire was circulated to all the 39 Dental College Libraries affiliated to Rajiv Gandhi University of Health Sciences, Bengaluru. Out of 39 Dental College Libraries, 35 libraries responded to the questionnaire and while the remaining 4 libraries did not respond, i.e. response rate is 89.74%. Hence the analysis of the data collected is based on the responses of these 35 libraries. This data is collected for the period of September 2010 to February 2011. The problems encountered in this process are identified possible suggestions are stated.

Key Terms: Library Collection, ICT Skills, Staffing Pattern, Library Services.

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INTRODUCTION

The term collection in the phrases seems not sufficient today. 'Collections and connections' are likely to be winning as a better replacement to address today's complex premise of electronic media with online dissemination of information. As collection development continues to evolve into collection management, the two areas together become increasingly difficult to define. Rapidly shifting emphases driven in part by economic factors[1]. The process initially was started in interconnection libraries so that information on collection can be shared. With the advent of full text retrieval by telecommunication, cooperative collection development and shared resources may eventually become a reality[2].

ICT has touched all the fields directly or indirectly in today's world. Innovations in information technology have brought radical changes in every possible field of life including libraries. The world has seen automation and digitization of libraries as some of the inevitable changes that took place in recent years. Global changes particularly in ICT have a tremendous impact on the functioning of dental libraries affecting all aspects of library operations, information resources and services and staff skill requirements. The impact of information technology revolution is huge on the new generation of students and researchers. Libraries are in limbo how to satisfy the hunger of this new generation to get information at the spur of the moment.

Information Technology is the combination of telecommunication and computer technology which facilitate transmission, collection, processing, interpretation and distribution of information. Information technology is considered to be useful to us in the digital world. The library has been involved in resource sharing initiatives for many years, yet the advent of new technologies, such as the World Wide Web, have fostered unprecedented growth in the number of institution impacting the world with rapidly evolving information products and services. Electronic information resources are of increasing importance in modern library services, particularly in special libraries that are oriented towards science and technology[3].

LIBRARY COLLECTION AND ITS IMPORTANCE

Library collection has witnessed the ages of clay tablets to papyrus sheets, paper documents, and silicon chips, optical and magnetic disc and so on. In every age, libraries have used latest technology. Importance of a library collection lies in the following functions, which it performs:

- Collection and dissemination of information is the most important function of a library.

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Importance and success of library collection lies in the satisfaction of users information needs.

Educational reading in a formal sense is the concern of academic, special and technical libraries. Such libraries should have such a varied collection so that they are able to fulfill these needs.

To make provision of information material for cultural and recreational reading is another important aspect, which enhances the importance of library collection. Collection preserves knowledge for the future.

bove all library collection is the pool of achievements of the reserved for the benefits presents and future generations.

RACTICAL PROBLEMS

he present status of the dental college libraries and the extent of brary collection, ICT skills, staffing pattern and library services re not standardized. The library services rendered by these braries may not be satisfactory to the users, because of their eaknesses. It is assumed that the information services should lly benefit to the user community. With this point of view, the searcher has to undertaken this problem for the present study.

ITERATURE REVIEW

he literature search is an attempt to identify, locate and nthesize completed research reports, articles, books and other aterials about the specific problems of a research topic. Ifidon[4] oines that a focused, positive, and consistent collection velopment strategy is a necessity for any meaningful library velopment. Elaturoti[5] sees collection development as the ocess of assessing the strengths and weaknesses in a collection d then creating a plan to correct the weakness and maintain the engths. Ikem[6] opines that collection development policy is the hicle through which the library achieves the goals of its readers' rvices. Proper budgeting (in line with the collection velopment policy) and its careful operation are vital to the ccess of library services activities. It should be used as a anning and monitoring instrument. Just as no group of activities n succeed without proper planning, so also the activities of eeting users need cannot succeed without proper policies and onitoring.

BJECTIVES

To find out the present status of library collection in dental college libraries in Karnataka.

To determine the present staff of libraries based on professional qualification.

To find out the distribution of library staff based on category.

To find out the library services provided by the libraries in Karnataka.

ETHODOLOGY, SCOPE AND LIMITATION OF HE STUDY

is article is base on comprehensive survey carried out by the thor for the period of September 2010 to February 2011. A uctured questionnaire was used as the tool for the survey. The estionnaire was circulated to all the 39 Dental College Libraries affiliated to Rajiv Gandhi University of Health Sciences, Bengaluru. Out of 39 Dental College Libraries, 35 libraries responded to the questionnaire and while the remaining 4 libraries did not respond, i.e. response rate is 89.74%. Hence the analysis of the data collected is based on the responses of these 35 libraries.

The following dental college libraries are taken into consideration for the study:

Table 1: List of Dental College Library

S. No	Name of the college library	Place	Code
1	AME'S dental college library	Raichur	A
2	AJ Institute of dental sciences library	Mangalore	B
3	Al-Ameen dental college library	Bijapur	C
4	Al-Badar rural Gulbarga dental college library	Gulbarga	D
5	Bengalore institute of dental sciences library	Bengaluru	E
6	Bapuji dental college library	Davangere	F
7	College of dental sciences library	Davangere	G
8	Coorg institute of dental sciences library	Virajpet	H
9	D.A. Pandu memorial R.V. dental college library	Bengaluru	I
10	Dayananda sagar college of dental sciences library	Bengaluru	J
11	Dr. Shyamala reddy dental college library	Bengaluru	K
12	Farooquia dental college library	Mysore	L
13	Government dental college library	Bengaluru	M
14	HKES'S Nijalingappa institute of dental sciences library	Gulbarga	N
15	JSS dental college library	Mysore	O
16	KGF college of dental sciences library	KGF	P
17	Krishnadevaraya college of dental sciences library	Bengaluru	Q
18	KVG dental college library	Sullia	R
19	M. S. Ramaiah dental college library	Bengaluru	S
20	M.R. Ambedkar dental college library	Bengaluru	T
21	Maratha Mandal N. G. H.Inst. of dental sciences library	Belgaum	U
22	NSVK. Sri Venkateshwara dental college library	Bengaluru	V
23	Navodaya dental college library	Raichur	W
24	PM. Nadagowda memorial dental college library	Bagalkot	X
25	S.B Patil institute of dental sciences library	Bidar	Y
26	Sharavathi dental college library	Simoga	Z
27	Siddartha dental college library	Tumkur	A1
28	SJM dental college library	Chitradurga	A2
29	SDM College of dental sciences library	Dharwad	A3
30	Sri hasanamba dental college library	Hassan	A4
31	Sri Rajiv Gandhi college of dental sciences library	Bengaluru	A5
32	The oxford dental college library	Bengaluru	A6
33	Vokkaligara sanga dental college library	Bengaluru	A7
34	Vydehi institute of dental sciences library	Bengaluru	A8
35	Yenepoya dental college library	Mangalore	A9

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ANALYSES AND INTERPRETATION OF DATA

The data collected through questionnaire were analyzed and interpreted with the help of using simple percentage. The data have been presented and analyzed by using tables and figures.

❑ Distribution of Library Collection

Table 2: Distribution of Library Collection

Library code	Total Books collection	Text book	Reference book	Book bank	Print For Journals	Print in Journals	Back volume	Back vol CD	Thesis/ Diss	E-Journals	E-Books	CD-ROM	Audio/ video	Total 2 to 13
	1	2	3	4	5	6	7	8	9	10	11	12	13	-
A	3000	2700	300	0	17	6	984	10	60	18	30	75	10	4210
B	5107	4831	276	0	32	23			93	42	18	36		5351
C	3063	3000	63	0	32	6	651	0	0	42		20		3814
D	2672	1920	752	485	9	5	92	4	0	28	22		35	3352
E	2874				18	4	148	25	31	42	18			3160
F	7289	2692	4597	175	69	5	2492	4	318	35	15	147	195	10744
G	5044	4926	118	287	89	12	1253	7		29		57	65	6843
H	3057	2417	640	0	42	14	483	160	43	29				3828
I	5489	4000	1489	151	25	5	792		288	37		375	70	7232
J	2291	1340	951	170	23	10	375	20	14	29		120	20	3072
K	3832	3632	200	0	36	10	200	200	45	20	17			4360
L	2400	2000	400	1800	15	20	100	20	0	65	20	10		4450
M	10056	7556	2500	706	52	2	2032					100	52	13000
N	2500	1700	800	0	22	7	250	0	40	13	0	60	35	2927
O	6570	5468	1102	289	78	20	2024	0	297	43	18	348		9687
P	2800	2400	400	0	16	1	8					60	5	2890
Q	3790	2790	1000	0	28	7	100					120		4045
R	3700	3000	700	100	41	13	1500	35	50	60		74		5573
S	5625	3500	2125	175	44	22	1306	10	102	37	20	250	19	7610
T	5470	2045	3425	1270	63	24	2750	8	120	24	2	80	40	9851
U	2455	1455	1000		36	10	206	81	22	29	18	205		3062
V	1803	1534	269		8	5	283					55		2154
W	2582	1226	1356		8	4	428	8	85	54		28	10	3207
X	5797	4026	1771	340	51	9	92	9	223	44		9	92	6666
Y	2200	1800	400	150	10	6	300	8		27		80	20	2801
Z	2408	2287	121											2408
A1	3114	2714	400	300	56	10	200	80	12	42	18		10	3842
A2	5000	4500	500	200	30	5	300	200	10	20	10	20	10	5805
A3	7500			500	75	5	2400		780	40	200	300	40	4340
A4	2960	1892	1068	342	35	15	60	10		29		110	5	3566
A5	4047	3147	900		10	20	253			36		109		4475
A6	5416	3393	2023		102	10	1377	3	59	42		227	12	7248
A7	5373	2211	3162	1060	53	12	1277	10	168	42	18	223		8236
A8	2623				55	11	300	176		37		200		3402
A9	8029	4328	3701	120	36	14	1259	2	279	34		93	27	9893

It is observed from the analysis of the data that these libraries mainly hold the collections such as: books, inclusive of reference books, textbooks, book bank, Subject periodicals, back volumes, CD-ROMS, E resources and some of the libraries major collection like e-resources, technical reports and back volumes CD's. Table 2 reveals that out of 35 libraries. It is found that 5(14.29%) libraries have the total collection of document's in the range between 2001-3000, 10(28.57%) libraries have the total collection which ranges between 3001-4000, 6(17.1%) libraries have the total collection which ranges between 4001-5000, 3(8.57%) libraries have the total collection which ranges between 5001-6000, 3(8.57%) libraries have the total collection which ranges between 7001-8000, 3(8.57%) libraries have the total collection which ranges between 9001-10000 and only 1(2.86%) libraries have the total collection which ranges

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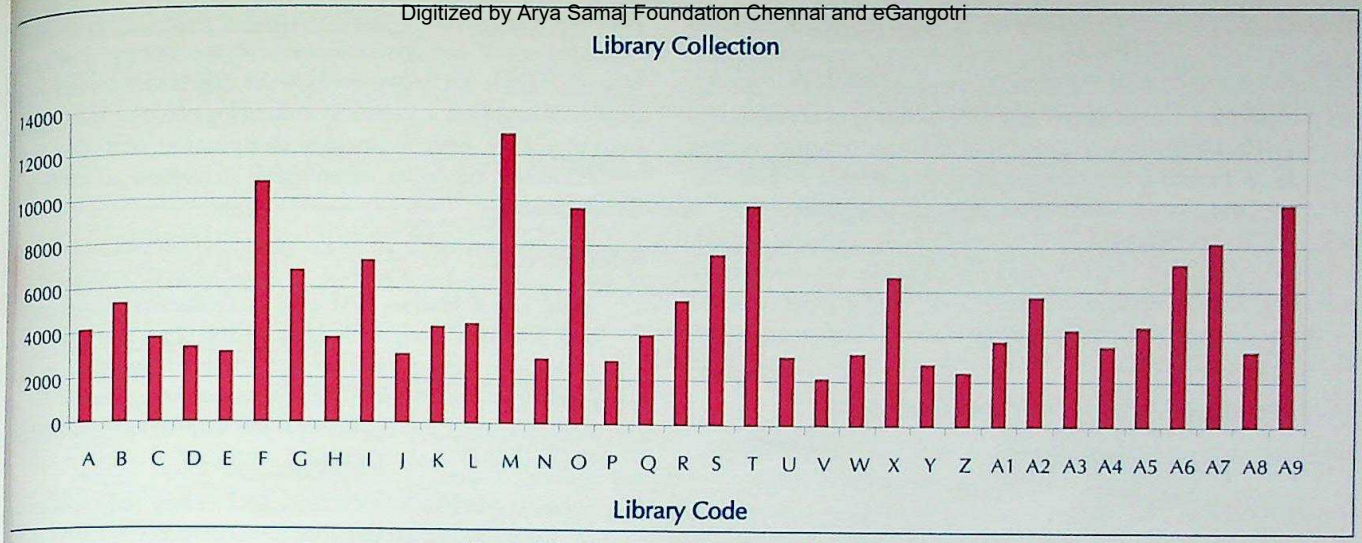

Fig. 1: Distribution of Library Collection

etween 10001-11000 and 1(2.86%) library have the total llection which range between 12001-13000. No library is ving collection in the range of 1-2000.

Present Staff of Dental College Libraries based on rofessional Qualification

Table 3: Professional Qualification of Library Staff

ualification	Total Professionals	College Library
. D	1	B
Phil	7	D, R, J, S, X, A2, A7
Lib.& Inf. Sc	26	A, C, E, F, H, I, K, L, M, N, O, P, Q, T, W, Y, Z, A1, A3, A4, A5, A6, A8, A9, V, U
Lib & Inf. Sc	1	G
tal	35	-

ble 3 reveals that, the distribution of libraries based on ofessional qualification out of 35 libraries. It shows that 26 rarians are having master degree in library and information ience, 1 librarian has bachelor degree in library and formation science, 1 librarian has Ph. D degree and 7 librarians ve M. Phil degree.

Distribution of Library Staff Based on Category

Table 4: Distribution of Library Staff Based on Category

Designation	Respondents
Professional staff	-
Librarian	35
Assistant Librarian	38
Semi-Professional staff	-
Library Clerk	19
Non-Professional staff	-
Library Attendant	70
Computer Assistant	17
Library Assistant	19

Table 4 reveals that in the total number of staff in 35 libraries that 35 staff working as a librarians, 38 staff working as a assistant librarians, 19 staff working as a library clerks, 70 staff working as a library attendants, 17 staff working as a computer assistants and 19 staff working as a library assistants.

Services Provided by the Libraries

Table 5: Services Provided by the Libraries

Services	No. of Libraries
Book Circulation	35
Periodicals	26
Reference & Information Services	32
OPAC	14
Printing	20
Photocopying	33
Bibliographic Services	14
Reprographic Services	17
Press Clipping	25
Inter Library Loan	15
Indexing & Abstracting Services	10
Translation	3
Current Awareness Services	25
Selective Dissemination of Information	10
Internet Surfring	35
Multimedia	16
FAX	24
User Orientation	22
MEDLAR/MEDLINE	15
Online Search	33
CD-ROM Search	29
Teleconferencing	7
Monthly New Arrivals	12

Table 5 reveals that all 35 libraries provide circulation of books to the users, 26 libraries provide circulation of periodicals. 32 libraries provide Reference and Information Services. It reveals that 14 libraries provide OPAC facility. The printing and

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photocopying facility is provided by 12 libraries respectively. It is found from the data that bibliographic services are provided by 14 (40%) libraries, reprographic services 17, press clipping 25, inter library loan 15, indexing and abstracting services 10, translation 3, CAS 25, SDI 10 and internet surfring provide 35 libraries. It is observed that multimedia services 16, FAX 24, and user orientation/education programme 22 is provided by the libraries. It is found that 15 libraries provide MEDLAR/MEDLINE Services and 33 libraries provide online search facility, 29 libraries provide CD-ROM database search, 7 libraries provide teleconferencing and 12 libraries provide monthly new arrivals.

Problems in Development of Collection and Services

- Lack of proper guidelines and planning.
- Insufficient funds.
- Lack of adequate qualified professional staff.

SUGGESTIONS

- The library should be provided adequate funds for books, book bank, periodicals, back volumes, CD-ROMS, and other collection like e- resources, technical reports etc.
- Proper staffing pattern is implemented in the library which is recommended by UGC/DCI.
- The main barrier faced by the libraries is the lack of skilled qualified staff.
- As per UGC guideline minimum qualification for librarian should be Master's Degree in Library and Information Science with National Eligibility Test for Lectureship (NET) or Ph.D. Librarians should be computer literates to utilize the ICT's.

CONCLUSION

The collection development is a planned, continuous, and cost effective acquisition of quality, relevant materials to meet the needs of users and the objectives of the library. Collection development is not only growth in volumes and titles but in the quality of acquired materials in enhancing effective information delivery. It is only from this perspective that the word 'development' could be meaningful in relation to collection development.

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Nanotechnology Literature: A Bibliometric Study

Amogh S. Lokhande

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Librarian
Institute of Chemical Technology, Matunga, Mumbai

Corresponding Author
Amogh S. Lokhande
amogh_lokhande@rediffmail.com

ABSTRACT

This bibliometric study uses the data from the Scopus database to analyze the Nanotechnology literature published during the period 2006-2010. The objectives are to know annual document productivity, rate of growth of literature, geographical distribution, language wise distribution and the most preferred source titles. It was found that the literature grew every year except in 2009, that the United States of America contributed the most documents, that most publications were in English language and that proceedings of SPIE the International Society for Optical Engineering was the most preferred source title. The source list generated can be used for collection development in various libraries.

KeyTerms: Bibliometrics, Quantitative Study, Productivity Study, Nanotechnology Literature, Annual Growth Rate.

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NTRODUCTION

ebster's Dictionary[1] defines Nanotechnology as 'the science of anipulating materials on an atomic or molecular scale pecially to build microscopic devices (as robots)'. While cording to Wikipedia[2] Nanotechnology is the study of physical enomena on the nanoscale, dealing with things measured in nometres, billionths of a meter. It is a field of study associated th Physics, Chemistry, Mathematics, Engineering, etc., while applications are in variety of fields such as Medicine, ectronics, Materials, Biotechnology and so on. Unarguably, it is e of the most researched areas in the knowledge domain. This as the reason deemed fit to investigate and study the antitative aspects of the literature on and about anotechnology.

bliometrics deals with the quantitative study of documents. The m 'Bibliometrics' was coined by Alan Pritchard[3] in 1969 and fined as 'the application of mathematics and statistical methods books and other media of communication.' This study is an empt to understand the various aspects of nanotechnology erature quantitatively.

TERATURE REVIEW

any studies have been published based on the bibliometric alysis of literature from various subject areas. Kumar and Gupta[4] conducted a bibliometric study to model the growth of Chemical Sciences literature. Rajendran, Ramesh Babu and Gopala Krishanan[5] used the Ei Tech Index database to conduct a bibliometric study of Fiber Optics literature to know the year wise growth of literature, contribution of various countries, authorship pattern, preferred bibliographic forms and core journals. While a bibliometric study of Laser literature in India was carried out by Rajendiran and Parihar[6] using the Scopus database to know the growth rate, author productivity, degree of collaboration and the core journals in the field. Likewise, there have been bibliometric studies of Nanotechnology literature too. Nazim[7] conducted the bibliometric analysis of nanotechnology research using data from Web of Science to find out the growth of literature, authorship pattern, most productive journals, most productive authors and most productive countries. Li[8] used the data from Science Citation Index Expanded database to study the growth rate of nanotechnology articles, to find out the top contributors to nanotechnology research, most productive institutes. Similarly, Youtie[9] used the data from the Science Citation Index to study the contribution of various blocs of countries to nanotechnology research, the growth in their contribution over the period and citation impact.

Peculiarly, all the above studies of nanotechnology literature were based on the data from the Web of Science or Science Citation Index database and neither of them analyzed the data beyond the year 2006.

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SCOPE OF THE STUDY

The present study is based on the literature covering the period from the year 2006 to 2010 only. The study is limited to the results yielded by the Scopus database during the search conducted and results received on 25th October 2012. The Scopus database is a proprietary product of M/s. Elsevier, and, they claim that it is the largest abstracting and citation database covering all the subjects.

OBJECTIVES

- To know the year-wise document output.
- To calculate the Annual Growth Rate (AGR) of the literature.
- To find out the geographical distribution of the literature.
- To know the language wise distribution of the literature.
- To know most preferred source titles.

METHODOLOGY

The data was collected from the SCOPUS database by using the 'document search' provision. The search was conducted for the term Nanotechnology, 'search field' selected was 'article title, abstracts, keywords' while the 'limit to' option was not applied for 'Subject Areas' that is the search was open for results from all the four subject areas Life Sciences, Physical Sciences, Health Sciences and Social Sciences & Humanities, it was applied for the Date Range (inclusive) as 2006 and 2010 respectively and the Document Type was set to all. The above search criteria resulted in 36900 documents.

RESULTS AND DISCUSSIONS

❑ Year-wise Document Productivity

For the period 2006 to 2010 a total of 36900 documents were published. The following table shows the year-wise break up.

Table 1: Year-wise Document Productivity

Year	Documents
2006	6239
2007	6519
2008	8552
2009	7351
2010	8239

Table 1 shows that the number of documents published is the highest during the year 2008. The number of documents grew over the period 2006 to 2008 from 6239 to 8552, but surprisingly dipped during 2009 with 7351, and, increased again in 2010 to 8239.

❑ Annual Growth Rate(AGR) of the Literature

Table 2 provides the AGR of the number of documents for period 2006 to 2010.

$$AGR = \frac{\text{End Value} - \text{First Value}}{\text{First Value}} \times 100$$

Table 2 shows that the year on year change in the number of documents was 4.487% in 2007, 31.185% in 2008 over the respective previous year. It shows a negative change of -14.043% in 2009 over 2008 and an increase of 12.079% in 2010 over 2009. The average AGR is 6.411%. The above trend of the number of documents contributed exhibiting a sharp increase followed by a dip and again followed by an increase is similar to that observed by Li[8] till the early 1980s.

Table 2: AGR of the Literature

Year	Documents	AGR %age
2006	6239	--
2007	6519	4.487
2008	8552	31.185
2009	7351	-14.043
2010	8239	12.079

❑ Geographical Distribution

There were 110 nations engaged in carrying out research and publishing literature relating to Nanotechnology. The table 3 lists the ten most productive nations in terms of the number of documents contributed. These apart, there are 16 nations contributing only a single document each, 5 nations with only two documents each.

Table 3: Geographical Distribution

Nation	Rank	Documents	%age	Cumulative no. of documents	Cumulative %age
USA	1	11920	32.30	11920	32.30
China	2	4247	11.50	16167	43.80
Japan	3	2379	6.44	18546	50.24
Germany	4	2287	6.19	20833	56.43
United Kingdom	5	1919	5.20	22752	61.63
South Korea	6	1912	5.18	24664	66.81
France	7	1481	4.01	26145	70.82
India	8	1227	3.32	27372	74.14
Italy	9	1149	3.11	28521	77.25
Taiwan	10	1057	2.86	29578	80.11

While, USA is the top ranked contributor with 11920 documents, China 4247, Japan 2379, Germany 2287 and United Kingdom 1919 occupy the next four positions to complete the top five contributors. That, USA is the top contributor matches with the results[8,9]. However, the rankings of China, Japan and Germany here do not exactly match with those by Youtie[9] and Li[8] but the three with USA form the top four contributors. Notably, there is a huge difference in the share of the first and the second ranked contributors. Interestingly the top three ranked nations contribute over half the literature, while close to 75% of the total literature comes from the top eight ranked nations only. And, the top ten ranked nations contribute over 80% of the total literature.

❑ Language-wise Distribution

The 36900 documents come from as many as 31 different languages. The most preferred language is English with as many as 35871 contributions, followed by Chinese 360, German 161, Japanese 148, etc. The table 4 provides the language wise distribution of publications.

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Table 4: Language-wise Distribution

Language	Documents	Rank	Cumulative No. of Documents
English	35871	1	35871
Chinese	360	2	36231
German	161	3	36392
Japanese	148	4	36540
French	111	5	36651
Russian	49	6	36700
Spanish	45	7	36745
Italian	24	8	36769
Portuguese	24	8	36793
Polish	23	10	36816
Korean	13	11	36829
Czech	11	12	36840
Ukrainian	7	13	36847
Dutch	6	14	36853
Hungarian	6	14	36859
Croatian	5	16	36864
Romanian	5	16	36869
Slovene	5	16	36874
Greek	4	19	36878
Lithuanian	3	20	36881
Serbian	3	20	36884
Slovak	3	20	36887
Turkish	3	20	36890
Bulgarian	2	24	36892
Swedish	2	24	36894
Arabic	1	26	36895
Bosnian	1	26	36896
Estonian	1	26	36897
Finnish	1	26	36898
Latvian	1	26	36899
Persian	1	26	36900

hat most contributions are in English language while Japanese nks fourth is consistent with the results by Nazim[7].

Most Preferred Source Titles

he Scopus database categorizes the data into only four types of urces, namely, Journals, conference proceedings, trade blications and book series. The source titles are listed in a nked order in the table 5 below.

Table 5: Most Preferred Source Titles

Source Title	Documents	Rank
roceedings of SPIE the International Society for ptical Engineering	1718	1
anotechnology	1116	2
ano Letters	796	3
chnical Proceedings of the 2008 Nsti anotechnology Conference and Trade Show ti Nanotech Nanotechnology 2008	714	4
Nature Nanotechnology	631	5
Small	587	6
Journal of Nanoscience and Nanotechnology	544	7
Journal of the American Chemical Society	497	8
Langmuir	481	9
ACS Nano	404	10
2007 7th IEEE International Conference on Nanotechnology IEEE Nano 2007 Proceedings	303	11
Ecs Transactions	286	12
Technical Proceedings of the 2009 Nsti Nanotechnology Conference and Expo Nsti Nanotech 2009	283	13
Applied Physics Letters	278	14
2006 IEEE Nanotechnology Materials and Devices Conference Nmdc	266	15
2010 10th IEEE Conference on Nanotechnology Nano 2010	258	16
Advanced Materials Research	256	17
Optics Express	244	18
2008 8th IEEE Conference on Nanotechnology IEEE Nano	242	19
Biosensors and Bioelectronics	240	20

Interestingly, the top ranked source title is not a journal, though twelve of top 20 ranked sources are journals. And, the top ranked journal sources are such journal titles that are dedicated to the field of Nanotechnology, thus, confirming that it is an established field of study now.

CONCLUSION

- Discounting the dip in number of documents in the year 2009, the number of documents dealing with nanotechnology literature has grown during the period of study.
- USA is largest contributor to the nanotechnology literature, and leads the other countries by a big margin.
- English is the most preferred language amongst nanotechnology researchers for communicating the researches.
- Proceedings of SPIE the International Society for Optical Engineering is the top source title. This source title is a conference proceeding, and, displaces the norm that journals are the preferred media for research communication.

SUGGESTIONS

There have been instances of nanotechnology literature spanning a decade or more being subjected to bibliometric evaluation with data generated from Science Citation Index Expanded database. It would be worthwhile to conduct a similar bibliometric study of Nanotechnology literature covering a longer span of time with data generated from Scopus database. Likewise, a bibliometric study of Nanotechnology literature involving comparison of results based on datasets generated from Science Citation Index Expanded and Scopus databases would give us more generalized results.

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Green Information Science: Information Science and its Interaction with Green Computing and Technology for Eco Friendly Information Infrastructure

Prantosh Kumar Paul

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FBAS
Bengal Engineering and Science University
Shibpur
West Bengal

Corresponding Author
Prantosh Kumar Paul
prantoshkpaul@gmail.com

ABSTRACT

A Green Environmental policy in today's age is an urgent requirement in almost all types of organizations, institutions and enterprises, whether it is a government or private, profit making or non-profiteering, small or large, production based or service oriented. The increasing rate of carbon dioxide in air creates so many environmental hazards. Therefore organizations are putting environmental agenda during establishment of building, campus or during purchase of equipments, machines, tools which are less energy consuming and recyclable and less carbon based. In this paper aspects of green technology and computing (including building Information Systems) discussed. The requirements of GISc for starting an academic programme for building green eco friendly information infrastructure are also suggested to the academic community.

KeyTerms: Green Information Science, Green Computing, Green IT vs Green ISc, Energy Informatics, Information Science and Technology, Academic Community, University Degree programme, MSc-Information Science.

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NTRODUCTION

reen Information Science (GISc) is a proposed interdisciplinary omain incorporated in Green Computing and Technological ndamentals and Information Science principles[1]. Though this is knowledge cluster of Information Studies, Computer Science, nformation Technology, Psychology, Cognitive Science, lanagement Science (from IS domain) and Electronics, Green echnology, Green Computing, Environment Management (from reen Science aspect), GISc may be helpful for information ommunity and professionals for building healthy information nfrastructure which should be eco friendly, pollution free, less arbon emission based, less power consuming. Fundamentally ll information dealing organizations and institutions may get the otential benefit of GISc if this academic programme is started in ie academia of IS. Then green eco friendly information systems ill be possible by utilization of principles and thus serve modern ay's policy makers and government authorities[2,3].

BJECTIVES

he main aims of this study are:

- To learn about the professional and industrial utilization of IS before reaching on GISc.
- To learn about the dimension and related nomenclatures of IS.
- To know potentiality of GISc as a specialization of BSc/MSc-IS.
- To learn the potential user of GISc.
- To know the potential and possible degree programmes on Green Information Sciences.
- To learn the main Challenges and issues related to GISc.

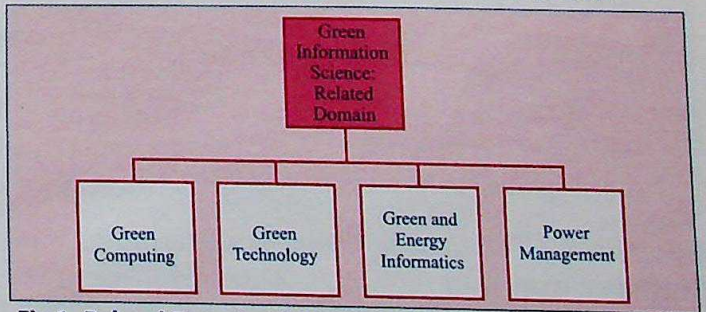

Fig.1: Related Domain of Proposed Green Information Science

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LITERATURE REVIEW

Till date research papers on GISc are very few. But some related works on GISc has already been carried out by some eminent Information Scientists, computer scientists, environmental engineers and geo scientists. Information schools have wider possibilities with green computing utilizations especially for wireless information systems building. Energy informatics and related field like Green computing and technology. Several opportunities are possible which includes, energy saving, virtualization of hardware and software, eco friendly power and information systems designing and management.

Green information infrastructure is the prime interdisciplinary area which relies on electronics, computer and information studies for healthy information architecture designing. Green computing based information system building, which is gaining main priorities in modern days in corporate and academics[4].

INFORMATION SCIENCE

Information Science or IS actually is a field of fields associated with the subjects which are related to Information as well as technology, directly or indirectly and the field are information studies, computer science, information technology, cognitive science, societal development and so on. IS is responsible for information collection, selection, organization, management, processing and dissemination[5,6,7]. Initially IS was treated as domain for information foundations such as information centre, documentation centers and so on. Though, today's interdisciplinary IS is dedicated to information systems and architecture building of an organization, group of organizations or Governmental enterprises including e-Governance rather than only information centre or information networks applications. Surprisingly IS is mistakenly considered as branch of computer science or it in computing community or even as a branch of library science in library and information community[6,8].

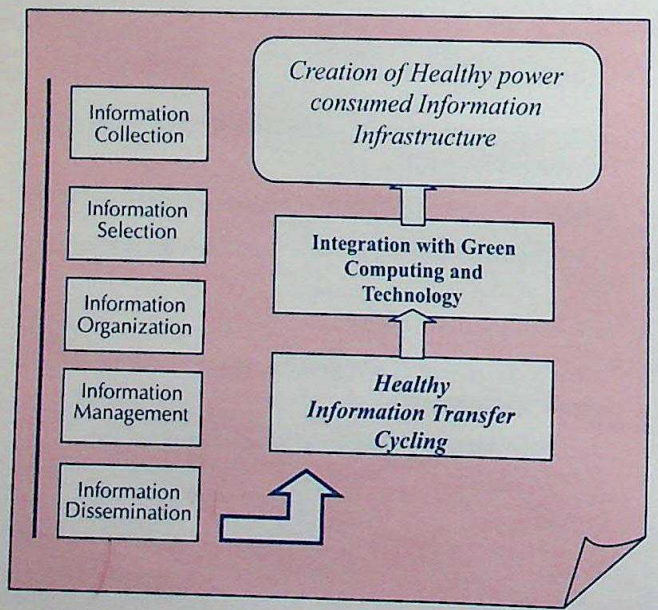

Fig.2: Integrated Approaches of Green Computing and IS

However in today's age it is a broad discipline dedicated to information, its study the behavior and properties of information and takes the help of technology and emerging fundamentals depending upon requirement. IS comes into play in any of the enterprises and areas where information in involved. Thus the involvement of information in libraries evolved LIS nomenclature. Due to the same type of nomenclature IS mistakenly understood that LIS and IS are same field[7,9]. Though, similar involvement of IS in Computer System/ Service bring us interdisciplinary fields' like: Computer and IS (CIS) Medicine & IS as Medical Information Science (MIS) Geography and Geo Science with Information Science (GIS)[8,4]. We may categorize IS as an Applied Science which may based on both Pure Science and Biological Science and create new nomenclature like-LIS, CIS, MIS, GIS and so on.

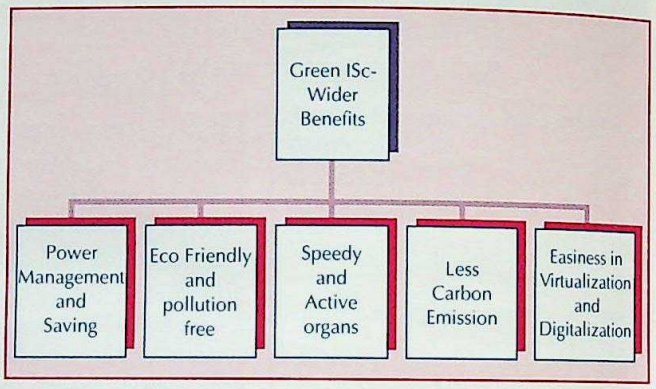

Fig: 3: Green Computing for Creation of Green Information Science

GISc: Integration of Green Computing and Technology with IS

Green computing is a study and a practicing field responsible for Green Eco Friendly less power consuming computing system[10]. Fundamentally Green Computing aims at designing and developing computing and IT infrastructure which should be based on Environmental policy, Power Management and Consumption, recycling and so on[11].

Green computing and green technology integration bring to us so many emerging academic fields[12]. The integration of green computing and green technology in informatics provide us green informatics, where its integration with business and commercial gradients results in business informatics.

So, as far as applications and utilizations are concerned, the following areas may be benefited or utilized by GISc:

- Almost all the aspects of information systems, its development and designing may be benefitted by use of GISc. By this Green eco friendly, less power consuming, less carbon emission based recyclable information systems designing is possible[13].
- Information centers, documentation centers, data centre, Information Systems and Networks (ISN), Referral Centers, libraries, internet centers are the largest stakeholders of IS. They can use GISc principles or GISc pass out (Degree holders) for building their concerned organization up to date and environmentally fit.
- For several Information Services like- CAS, SDI, online references and referral services, enterprise resource planning, document deliver services, short stage and large range information services we need to take the help of computer and other electronics peripherals. Thus,

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applications of GISc deal with important impact in information services.

For building eco friendly E Publishing and for turning publishing departments from manual to electronic mode we can use GISc principles.

For healthy information networks and information infrastructure building we need to use computer and information systems. Thus backed by GISc principles, ultimately a good healthy environment and society can be created[14].

ISc: Some Allied Areas

here are so many allied and related areas of GISc like Geo nformatics (based on spatial Eco Friendly Information System esigning), Energy Informatics (based on Power Consumed nformation Practice), Green IT (which provides importance on co friendly, recyclable IT infrastructure building), Green omputing (allows only green principle adaptation in computer urchasing, using, designing which is eco friendly and less power onsuming)[12,13]. Thus, only GISc/ green informatics is esponsible for green information system building for rganizations, enterprises and MNC's as well as academic nformation foundations, such as information centers and braries, documentation centre for healthy modern energy nsumed information division[15].

ractically GISc is responsible for overall green information frastructure building including Information Systems, Centers, etworks and are applied in MNC's, organizations and the dividual information foundations like information centre, ocumentation centre, information networks, knowledge tworks and the like, the its scope is enormous with larger users d stakeholders.

an academic programme, GISc may be offered in IS partments (which must design their curriculum with adequate formation and computing gradients) or newly evolved I schools information schools[3]. Apart from these, GISc programmes are so possible to offer in computing, IT, Geo Informatics, MIS, formation systems departments and schools. It is important to ote that GISc programmes should be based on information, mputing and green fundamentals rather than only on IT and een fundamentals (as used green IT, green informatics, and een computing) for sophisticated information infrastructure uilding.

he nomenclature of GISc may be:

Green Information Science

Green Computing based Informatics

Green Informatics

o far as level of study is concerned, depending upon equirement this is may be started at BSc, M.Sc., MPhil, Ph.D. evel. And the nomenclature of the programme may be a full-edged or partial as specialization like:

BSc/MSc/MPhil/PhD-- Green Information Science (GISc)

MSc-Information Science (GISc/Green Computing).

MSc-Information Science (Green Informatics).

- BSc/MSc/ MPhil /PhD -Information Technology (GISc/Green Computing/ Green Informatics and So on

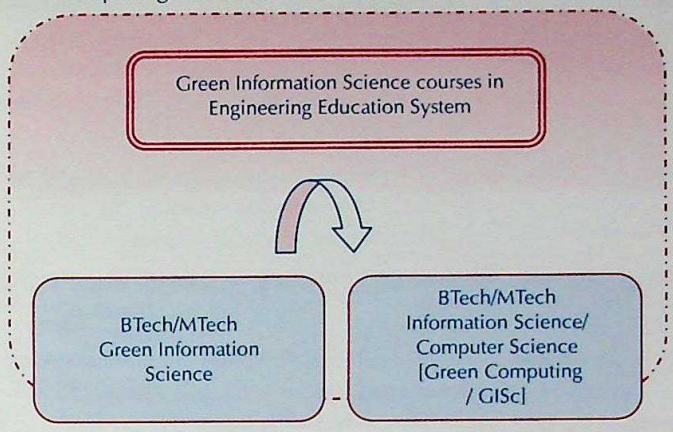

Fig.4: Basic and Possible Courses of GISc in IS Flavor

GISc: CHALLENGES AND ISSUES

As an academic programme GISc has so many challenges. Following are the key challenges and issues of GISc meant for academics and industrial benefits[1]:

- Academically it needs more interdisciplinary skills in the faculty members. They need knowledge of IS along with computer, cognitive science, operations research and obviously green technology.
- During the start of a course or academic programme for availability of students its industrial and academic acceptance also need to be taken care of.
- It requires a healthy system analysis and design, thus it needs proper fund and policy or planning.
- Running GISc in the old Information focused IS or LIS courses are really challenging as these schools are totally based or focused on library concept's
- A creation of awareness regarding the benefits of GISc is really challenging to the students and research community.
- Unwillingness to change is another big problem.

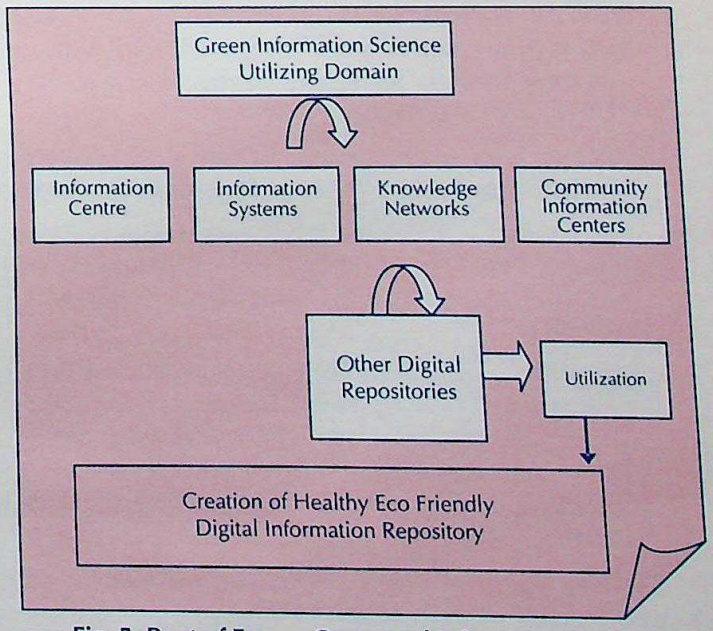

Fig. 5: Root of Energy Consumed Information World

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SUGGESTIONS

- Information School(I-Schools) both newly constituted, which believe in interaction of information-people-technology or existing Knowledge Organization based need to start the programme on GISc as a full-fledged course or as a specialization of IS[1,6,15].
- Proper awareness, workshop, seminar, training should be organized regarding the benefits of GIS, its nature, interdisciplinary knowledge gradients and so on.
- Fund from government side and scientific foundations should be available.
- Healthy policy on environment should be scheduled for MNC's.

CONCLUSION

Information Science is really a wonderful discipline for building healthy information systems and complete information transfer cycle in academics as well as industries. IS based on tools may be classified as manual KO, indexing, documentation focused or computing and IT structured[16,17,18]. Though, as discussed IS may integrate with other domain with pure science or bio science. Thus, GISc may be treated as specialized IS, incorporated with green computing and green technology fall under pure sciences or pure IS specialized in nature. As like medical information science which is based on medical science and IS integration, Geo-information science and so on[8]. Green aspects and technologies are most important concepts in today's age. Thus we need to use green computing and green it and technology in information industry and information infrastructure building and also need to take care of starting new fields or start academic specializations. Information professionals need to put importance on green technology use in information science practices, thus we need GISc for healthy Eco friendly, less power consuming information systems and information infrastructure building. So let us welcome GISc for a greener society powered by technology[5,6,3].

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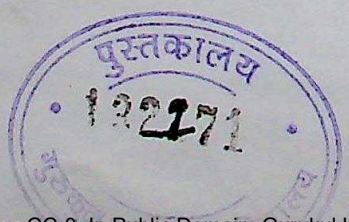

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